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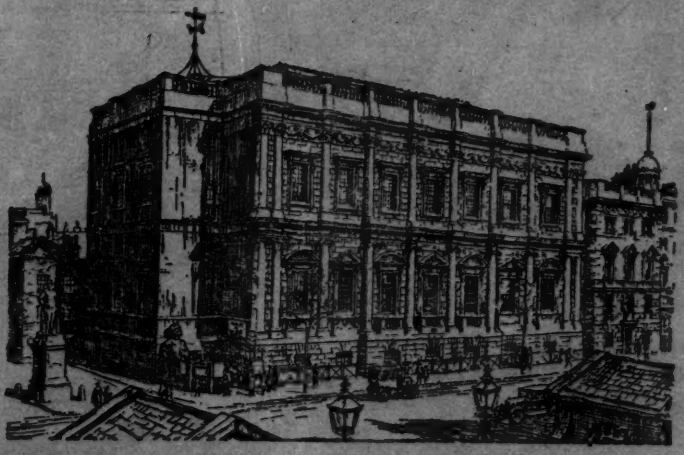

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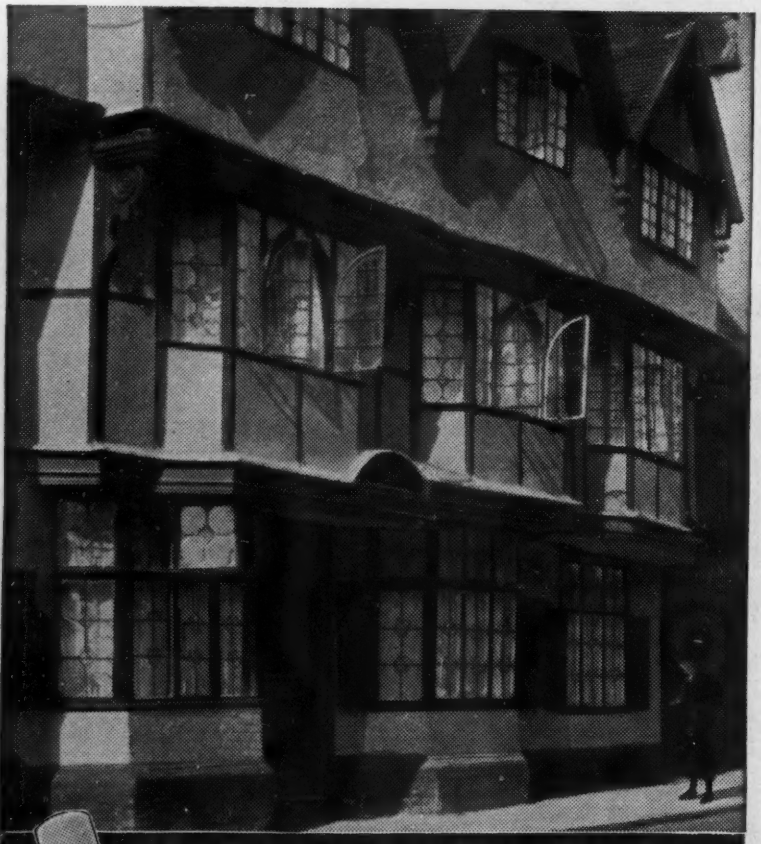

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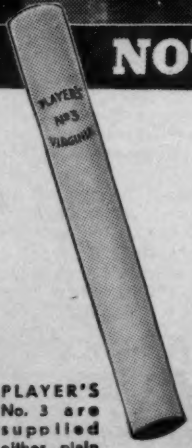

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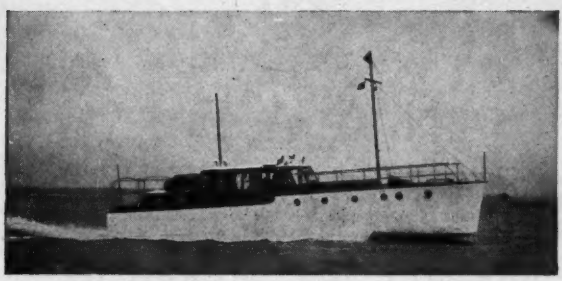

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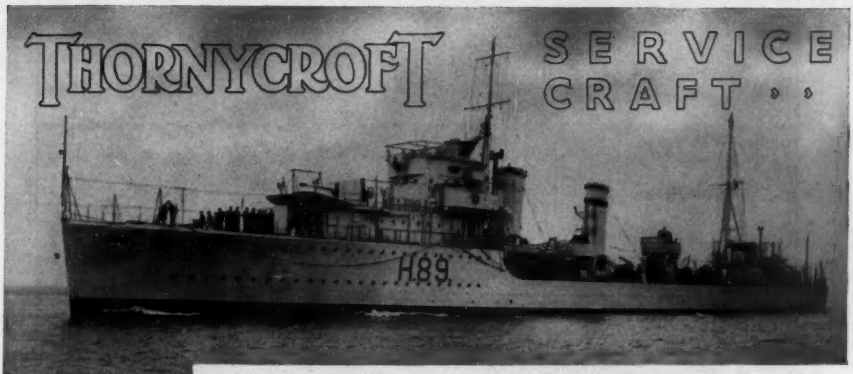

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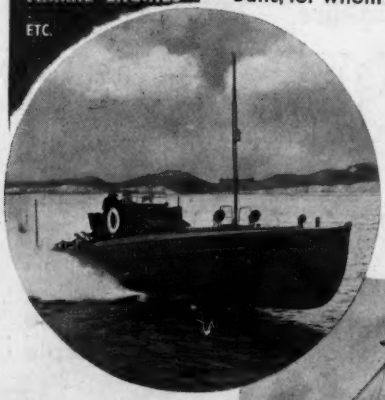

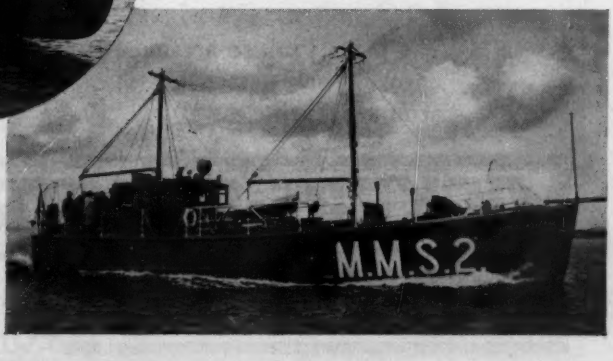

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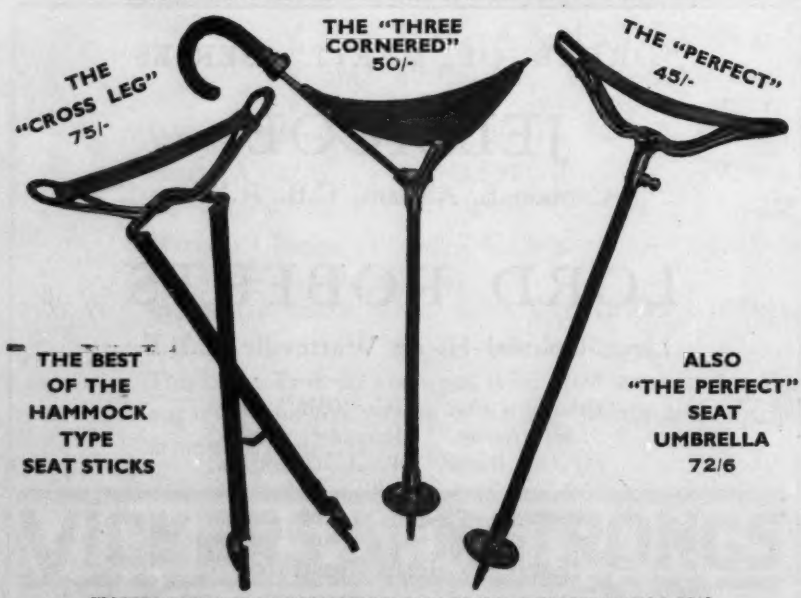

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Situated in the Banqueting Hall of the old Palace of Whitehall (1622), with its magnificent Rubens ceiling, the R.U.S. Museum is a treasure house of relics and mementoes of great victories and renowned warriors. There is also a most valuable collection of Uniforms, Medals, Ship, Tank, and Aircraft Models, and models of the battles of Trafalgar and Waterloo.

For Members and their friends, there are private entrances to the Museum from the Institution.

H.M. Forces in uniform are admitted free at the public entrance.

Admission to the general public is 1s.; Wednesday and Saturday after Noon, 6d.

SECRETARY'S NOTES

November, 1938.

EMERGENCY CLOSING

The Institution building was taken over by the War Office during the recent crisis, and was therefore closed to Members from 27th September to 10th October.

Ex Officio Members of the Council

Admiral Sir Roger R. C. Backhouse, G.C.B., G.C.V.O., C.M.G., has succeeded Admiral of the Fleet Lord Chatfield, G.C.B., K.C.M.G., C.V.O., D.C.L., as an *ex officio* Member of the Council on taking up the appointment of First Sea Lord.

Vice-Admiral C. E. Kennedy-Purvis, C.B., has succeeded Vice-Admiral Sir S. R. Bailey, K.B.E., C.B., D.S.O., as an *ex officio* Member of the Council on taking up the appointment of President of the Royal Naval College, Greenwich.

New Members

The following officers joined the Institution during the period 16th July to 17th October, 1938.

ROYAL NAVY

Lieutenant G. P. Darling, R.N.
Commander F. G. Loring, O.B.E., R.N.
Captain H. J. Egerton, R.N.
Lieutenant P. G. Sedgwick, R.N.
Lieutenant the Hon. David Edwardes, R.N.
Lieutenant-Commander K. Durston, R.I.N.
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Lieutenant-Commander M. H. St. L. Nott, O.B.E., R.I.N.
Lieutenant-Commander E. C. Streatfeild-James, R.I.N.
Sub-Lieutenant M. D. Pope, R.N.
Lieutenant B. Walford, R.N.

ARMY

Captain G. L. Pethick, Royal Artillery.
Lieutenant H. Winterbotham, Royal Signals.
Colonel Evelyn F. M. Wood, C.B., D.S.O., O.B.E., late Royal Dragoons and London Heavy Bde., R.G.A. (T.).
Lieutenant K. G. Douglas, 2nd Battn. Royal Garhwal Rifles, I.A.
Captain J. F. Metcalfe, The Queen's Royal Regiment.
Lieutenant R. Dinwiddie, Royal Engineers.
Lieutenant G. L. W. Andrews, The Seaforth Highlanders.
Captain C. H. V. Pritchard, The Royal Welch Fusiliers.
Captain W. P. Symonds, The Devonshire Regiment.
2nd Lieutenant P. D. H. Marshall, The Middlesex Regiment (D.C.O.).
Lieutenant G. M. de M. Blum, Royal Signals.
Captain N. T. Herbert, The Green Howards.
Major R. D. Jackson, Army in India Reserve of Officers.
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Lieutenant A. J. Snodgrass, The King's Regiment.

Captain J. Radford, The North Staffordshire Regiment.
Captain W. Prettejohn, Royal Artillery.
2nd Lieutenant C. O. L. Ramsden, Royal Artillery.
Major R. C. H. Baker, 8th (1st City of London) Battn. Royal Fusiliers.
Lieutenant R. C. Macdonald, The Royal Warwickshire Regiment.
Captain R. F. Parry, The Buffs.
Lieutenant R. H. Bromley, Grenadier Guards.
Lieutenant J. R. Johnson, The Royal Welch Fusiliers.
Lieutenant C. A. T. Halliday, The Hampshire Regiment.
Major J. D. Tucker, The Burma Rifles.
2nd Lieutenant J. O. Parry, Royal Artillery.
Captain H. D. Oclee, The Loyal Regiment.
Lieutenant W. de L. M. Messenger, Royal Tank Corps.
2nd Lieutenant A. B. Speak, 5th Battn. The Leicestershire Regiment (T.A.).
Lieut.-Colonel W. W. Richards, M.C., R.A.O.C.
Captain H. R. L. Hodges, Royal Horse Artillery.
2nd Lieutenant W. L. Ridout, Indian Army (unattached list).
2nd Lieutenant G. M. T. Lindsay, Royal Artillery.
2nd Lieutenant M. H. D. Lovell, Royal Artillery.
Major I. D. S. Gordon, The Middlesex Regiment.
Captain Sir J. S. V. Marling, 17/21 Lancers.
2nd Lieutenant D.R.S. FitzGerald, Irish Guards.
2nd Lieutenant J. N. I. Leslie, Irish Guards.
Lieutenant J. D. N. C. Henderson, The Royal Scots Fusiliers.
2nd Lieutenant Hon. M. Fitzalan Howard, Scots Guards.
Major N. E. Cobbold, late The Hampshire Regiment and Labour Corps.
Lieutenant M. J. A. Paterson, The South Wales Borderers.
2nd Lieutenant G. L. S. Pike, Scots Guards.
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Flight Lieutenant D. D. Christie, R.A.F.
Flight Lieutenant E. C. Kidd, A.F.M., R.A.F.

Gold Medal Essay (Military) 1939

The following subject has been selected :—

" The development of air forces has increased the burdens imposed on Home Defence. Discuss its effects on the role and organization of the Regular and Territorial Forces in the event of a major European War."

Gold Medal Essay (Air) 1938

The following essays have been received :—

" We will fight on for ever and ever."
" Skon il Ligi Mgandekx Tobzog."
" When an enterprising Burglar goes a-burgling."

RESEATING OF LECTURE THEATRE

The Lecture Theatre has been redecorated and reseated with comfortable chairs instead of the old-fashioned benches.

CHRISTMAS CARDS

Christmas cards specially designed for Members of the Institution will shortly be on sale, and orders can now be booked. This year's coloured card has a reproduction on the outside of the picture in the Crookshank Collection of an old-time combined operation, entitled "An Opposed Landing—The Expedition against Louisbourg, 1745," a larger copy of which appeared as the frontispiece to the JOURNAL for August, 1926. Inside is the Institution's crest and seasonable greetings. The ribbon is a three-coloured one, combining Navy blue, Army red and Air Force light blue. The price, including envelopes, is 6s. per dozen, post free.

An alternative card which will be available is that with the crest on the outside and a reproduction of the black and white sketch of the exterior of the Banqueting House inside. The price of these, with envelopes, is 4s. per dozen, post free.

Members are requested to make early application for the number of cards they require, stating which design and *enclosing the requisite remittance with their order.*

LIBRARY

Up-to-Date Information

Books relating to International Affairs, Defence Problems, and Service Developments are liable to become out of date, whereas articles published in quarterly and monthly journals and magazines frequently supply valuable information in connection with recent changes. With a view to enabling Members to be supplied with the latest information, such articles are bound up in pamphlet form and indexed under their appropriate subjects. If Members will state what subject they are particularly interested in, the Librarian can often assist them with the loan of one or more such pamphlets to supplement the latest book dealing with it. The Library has other sources of up-to-date information which may be of assistance to Members, particularly those who are engaged in special studies connected with Promotion Examinations or in preparation for the Staff Colleges.

Members' Book List

A list of books required by Members can be registered, and they will be advised as soon as each book is available. Alternatively a registration card can be supplied on request to enable Members to compile their own lists.

Books are only sent without previous advice by the express wish of the Member.

N.B.—IN VIEW OF THE INCREASING DEMAND FOR BOOKS FROM THE LENDING LIBARARY, IT IS ESSENTIAL IN THEIR OWN INTERESTS THAT MEMBERS SHOULD ADHERE STRICTLY TO THE RULES GOVERNING THE RETURN OF BOOKS. FAILURE TO DO SO CAUSES MUCH INCONVENIENCE AND INVOLVES THE INSTITUTION IN UNNECESSARY EXPENSE AND CLERICAL LABOUR.

Periodicals for Sale

The following periodicals for 1939 will be sold to the highest bidder: "The Aeronautical Journal," "Airways," "Blackwood's Magazine," "Blue Peter," "The Journal of the Royal Geographical Society," "Punch," "New Statesman and Nation," "The Spectator" and "The Scientific American."

Offers should be addressed to the Librarian before the 15th January, 1939. Copies will be despatched as they are withdrawn from the Reading Room.

JOURNAL

Date of Publication

In future the JOURNAL will be published on the 25th January, April, July and October, but the numbers will still be known respectively as the February, May, August and November issues.

February and May Journals

Owing to exceptional demand for the JOURNAL of February, 1938, the Institution's stock of that number is exhausted. Will any Member who has finished with his copy kindly return it, in order that copies of this issue may be available to new Members joining later in the year. There is also a shortage in the stock of May, 1938, JOURNALS, for which there has been a heavy demand.

MUSEUM

Additions

(9004) Piece of the Colours given to the 100th Regiment in 1859, and piece of those given to the Royal Guernsey Light Infantry in 1884.—Given by Major N. H. C. Dickinson.

(9005) Officer's Cap of the Royal Naval Air Service.—Presented by Captain H. D. Briggs, C.M.G., R.N.

(9006) R.A.F. tunic and cap, 1920, and copy of the first Order appointing officers to the R.A.F.—Presented by Captain H. D. Briggs, C.M.G., R.N.

(9007) Pouch of the Light Cavalry, British German Legion, 1854.—Presented by the Marquess of Cambridge.

(9008) Lock of Nelson's hair.—Presented by Miss A. Edwards.

(9009) Model of an anti-aircraft position in Malta, 1935.—Presented by Captain H. J. Stokes-Rees. R.A.

(9010) Full dress uniform, Bombay Horse Artillery.—Presented by R. S. Hilton.

(9011) Two coats of the Manx Fencibles, 1800.—Presented by Lieut.-Colonel B. T. Ready.

(9012) Photographs of officers on the march from Cabul to Candaha, with key.—Presented by Lieut.-Colonel C. C. Anderson.

(9013) Model of a Bristol " Bombay " Bomber Transport.—Presented by the Bristol Aeroplane Co.

(9014) Water-bottle of the Waterloo period.—Presented by the Moyse's Hall Museum, Bury St. Edmunds.

(9015) South African Medal, 1759.—Presented by Captain R. J. Harper.

(9016) Naval General Service Medal.—Presented by J. C. Cumming.

(9017) " Brevet d'Honneur " signed by Bonaparte.—Presented by Dr. Wilson Parry.

(9018) Headdress 5th Dragoon Guards, 1904–34.—Presented by Mrs. Barrett.

(9018) French " Chasepot " rifle, 1870.—Presented by Captain J. C. Ledward.

(9020) Officer's coat, Royal Regiment of Artillery in Ireland, 1790; officer's shell jacket, Paymaster's Department, 1864.—Presented by Major E. P. N. Jones.

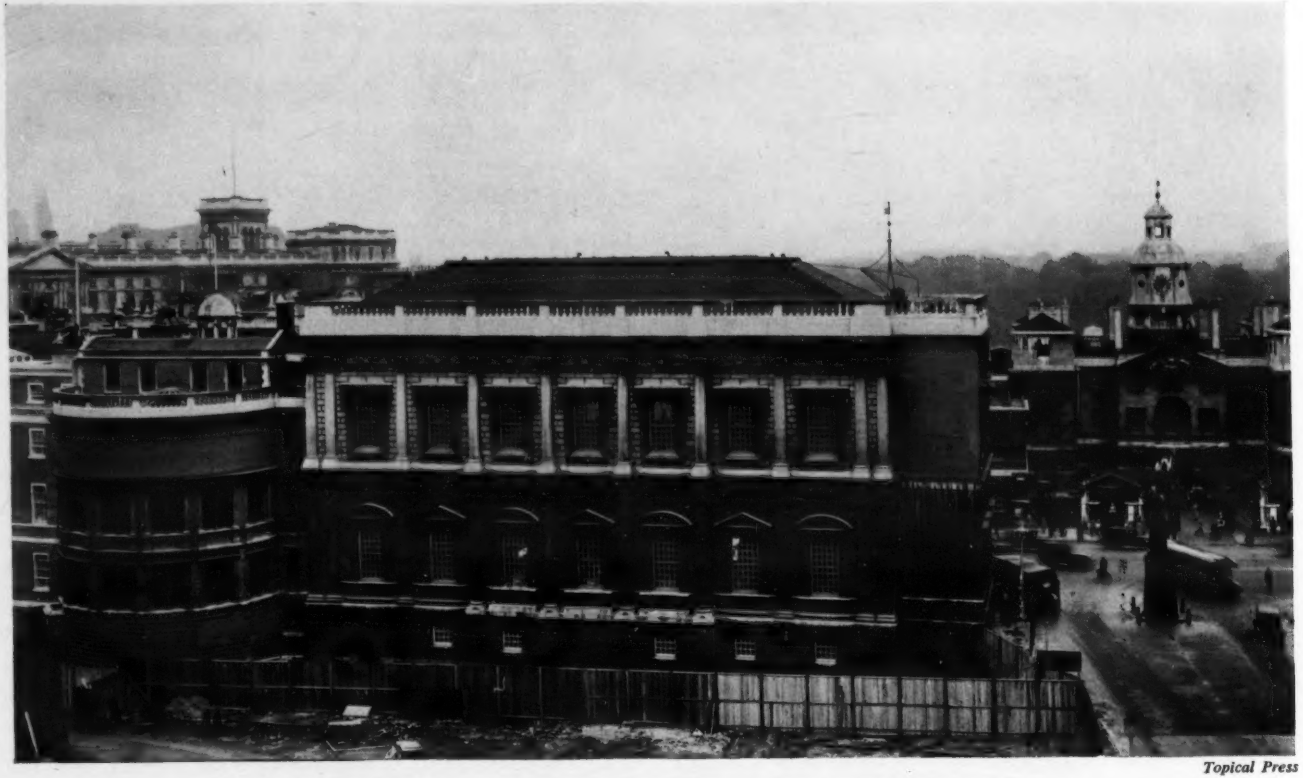
(9021) Sword and accoutrements, 5th Punjab Cavalry.—Presented by Colonel H. E. I. Palmer.

(9022) Colts Pocket Pistol, No. 1.—Presented by Major E. J. E. Strong.

Attendance

The amounts taken for admission during July, August and September were as follows :—

£132 8s. 6d. in July.
£204 11s. 0d. in August.
£146 2s. 6d. in September (Museum closed from 27th September).



Topical Press

THE ROYAL UNITED SERVICE INSTITUTION 1938

A VIEW OF THE EAST SIDE TAKEN DURING THE DEMOLITION OF GOVERNMENT OFFICES ON THE SITE OF THE FORMER WHITEHALL PALACE

THE JOURNAL
OF THE
Royal United Service Institution

Vol. LXXXIII. NOVEMBER, 1938 No. 532.

[Authors alone are responsible for the contents of their respective Papers. All communications, except those for perusal by the Editor only, should be addressed to the Secretary, Royal United Service Institution.]

THE CHEMIST'S ROLE IN NATIONAL DEFENCE

By LIEUT.-COLONEL HAIG SHEKERJIAN, Chemical Warfare Service, United States Army.[1]

CHEMICAL science as a major agency of war is one of the really significant developments in military science of our times, and in recent years it has endowed armed forces with some very remarkable weapons; moreover, I suspect that there are more to come.

There was a time, not long ago, when the chemist was but casually concerned with armament programmes. Before the Great War, his talents were occasionally employed in improving propellants and explosives, and on problems involving metallurgy. But that was about all. In a war he could have his share of adventure, if he wanted it, as a gunner or as a 'doughboy' (as we call him). No one thought of the chemist as possessing special knowledge or experience of great value to the military service. But now all that has changed, and to-day he is more or less a marked man. If he is an outstanding chemist, he will find himself booked well in advance of war for a job where his special qualifications may be expected to contribute rather directly to his nation's military defence. This change in the attitude of governments toward their chemical experts may be dated very exactly to a day in April, 1915, when urgent appeals from the neighbourhood of Ypres brought such men as Haldane, Pope and Lebeau scurrying from the laboratories of London and Paris onto the battlefields of eastern France. Gas was in the air! Soldiers did not know what to do about it; and they turned instinctively and inevitably to men who did. Something new had appeared in warfare. Instead of the forthright projectile to which armies had become accustomed through some centuries of experience, a pervasive toxic chemical had been introduced to attack a vulnerable

[1] This article was originally in the form of a lecture given by the author to the Toronto Chemical Association earlier in this year (1938).

part of man's anatomy—his lungs. The molecule was challenging the bullet. For the first time in military history, breathing became hazardous as a result of the deliberate artificial contamination of the atmosphere.

In military doctrine great stress is laid on the element of surprise: we are taught that if something unexpected can be sprung on an opponent half the battle may be won. This operation of 22nd April, 1915, produced one of the classical surprises of military history—the advent of a really unique method of warfare. That the immediate tactical advantages were not greater is to be attributed to two factors. In the first place, the Germans in launching their first gas attack did not follow it by aggressive military action. Up to that time soldiers, if they looked at chemists at all, viewed them as rank amateurs in military affairs, and the German chemist, although he commanded the respect of the scientific world, did not cut much figure with the German Great General Staff. They let him put on a show in which the Army itself took little part. Then, too, the yellow fog drifting across the Belgian landscape on that late Spring afternoon encountered a strong human barrier—the First Canadian Division. I shall not attempt to eulogize the action of these troops in that particular battle—you will find that recorded in official histories of the War—but one reason this first German gas attack did not gain important tactical success was certainly because those Canadians stood so firmly against the ensuing German assaults.

Thus was a major scientific innovation sprung on an unsuspecting army. We must go back to the introduction of gunpowder, six centuries earlier, for an equally revolutionary development in warfare. Yet I venture to predict that the same degree of surprise will never again be achieved so far as concerns gas warfare; for the Ypres operation awakened military staffs throughout the world to the potentialities of modern chemical science and to the possibilities of the application of chemistry to armed combat. "Forewarned is forearmed." The general public has also become alive to the prospects of chemicals in war, and we find the man in the street attributing to these agencies powers and potentialities which the scientist at once realizes they cannot possess. The hysteria which often follows the innate fear of war gases is illustrated by an occurrence at one of our war gas manufacturing establishments in the United States during the Great War. One day a workman happened to glance up and saw rising over the tree-tops a cloud of dust that had been lifted by a wind storm. He immediately yelled "Gas!" dropped his tools, and ran for his life. Other workmen around him quickly followed suit, running in all directions from the arsenal grounds. Some coloured workmen who had been in the shower

baths did not stop to dress, but ran out and joined the panic-stricken mob. One Major had just lathered his face for a shave when the alarm was given. He showed no curiosity or indecision, but ran, hopped on a passing truck, and when it had reached a safe distance from the arsenal he happened to raise his hand nervously to his face; glancing at his hand he was startled by the lather on it, and, turning to the man next to him, he exclaimed: "My God, what has the gas done to me!" Such unreasoning fear may be difficult to explain, yet it exists to-day in the minds of many people, and the fact that it is so prevalent merely emphasizes the need for a more general understanding of the scientific concepts of chemistry.

Why was it that gas warfare, which to-day so strongly colours popular thoughts of future combat, did not materialize until the War was well under way? For an answer we must look more to industrial than to experimental chemistry. All the chemicals effectively used in the War had been produced in laboratories years earlier, and the formula of each was known or accessible to scientists everywhere. But there is a wide gap between theoretical and applied knowledge—in science as in all human affairs. Although the direct use of chemical agents in warfare had been seriously discussed as early as 1899, this use could not be effected until vigorous maturity was attained by industrial chemistry. Only in comparatively recent years has it been feasible to produce the large quantities of agents required for chemical combat. This time may be designated as well within a decade before 1915. Prior to that, chemical warfare was not even a demonstrable theory. However, the year of grace 1915 found the chemical industry quite prepared to thrust this new agency of war into the soldier's rather unwilling hands. In utilizing these materials in the field, once their military value had been demonstrated, a special technique had obviously to be devised. This differed greatly from the traditional lines of soldiering. The chemist alone understood the actions and reactions of the substances brewed in the chemical plants far to the rear; he was, therefore, gladly entrusted with much of the work immediately connected with launching gas attacks; and he soon emerged on the battlefield as a soldier in his own right—and, in some armies, with his own characteristic insignia. Under the pressure of circumstances, the chemist in due course became something of a tactician at the front as well as an important military technician in the rear.

As to the evolution of gas warfare, I need present only a brief outline. Starting with chlorine, the first step was to produce a more efficacious gas for attacking through the lungs—which proved to be phosgene. The transition from toxic gas to obscuring smoke was easy; and it was

soon found feasible to generate clouds from a solid material as well as from a highly compressed gaseous compound. The first year of chemical warfare closed with both solids and liquids, in addition to gas, appearing as active war agents, employed for the purpose of injuring not only lung tissues, but also the eyes and, in the case of phosphorus, of burning the body surface. The next and most distinctive innovation was brought out in 1917—a liquid with highly vesicant properties, dangerous to the body tissues in either liquid or gaseous state. Thus chemical agents were developed which, in each of the three physical states of matter, were found to affect man through the eyes, the lungs, and the skin surface.

So far as the average soldier is concerned, war gases may be said to fall into two classifications. There are those he knows about, which are really not so bad—at least after he has met them once or twice in the field and managed to avoid serious injury from them. Then there are those new gases which have not yet been used, but which he hears are on the way. These he fears are really bad, and from all accounts will win the war for the army that first brings them into the field. Thus psychology enters the picture and plays an important part in furthering the broad purpose of all military action—the weakening of an opponent's will to resist.

When I say that the gases we know about are " not so bad," I refer to their actual physiological effects on the average soldier as represented by casualty statistics. From combined statistics of Great War casualties we know that the ratio of deaths to gas casualties for all belligerents was only about seven per hundred, whereas deaths from *all* causes ran up to twenty-five per hundred men wounded. Most of the surviving gassed casualties were returned to duty in periods varying from two to eight weeks; the after-effects of their exposure to gas are practically negligible. These simple facts are really very significant and refute much of the erroneous impression that is so prevalent as to the *deadliness* of modern war gases.

Nevertheless, I must state here that, from the viewpoint of broad military effectiveness, the total results produced in any military operation by the use, or threatened use, of chemical agents are much more extensive than can be deduced from the mere total of men actually incapacitated. As a matter of fact many chemicals—smokes, incendiaries, and the irritant gases—ordinarily produce little or no casualty effect, yet they are important implements of war. To assay the full effectiveness of chemical agents in modern warfare would involve material digression from the topic. But it is now generally understood that the value of anti-aircraft artillery is not measured merely by the

number of planes shot down ; similarly, the potential threat of chemical armament affects tactics and even strategy, and exerts an influence more far-reaching than is indicated by the mere number of men put out of action. The casualty-producing gases, especially vesicants and lung injurants, are certainly toxic enough to lead us to expect a much greater effect in battle than we actually find. While a million and a quarter gas casualties were inflicted during the Great War, the number that might have been produced, considering the quantities of gas ammunition used, runs into astronomical figures.

There are two explanations for this wide difference between the theoretical efficiency of war gases and the results they actually produce in the field. First must be considered the technical difficulties encountered in establishing and maintaining over considerable areas of open terrain the concentrations of these chemicals required to produce positive physiological reactions. Once gas is released to open atmosphere, all the counteracting influences of nature start quickly to work, tearing it down and destroying its toxicity by dispersion, dilution, diffusion, hydrolysis, and so forth. In gassing an area of land, we are attempting something actually repugnant to nature, and we soon find that nature can be propitiated only by a high degree of technique applied under rather favourable circumstances.

Chemical experiments, conducted under controlled laboratory conditions, give very different results from the same experiments conducted out of doors. The more ambitious the military-chemical operation, the more striking becomes this disparity between the theoretical and the practical efficiency of the chemical substances employed. An appreciation of this leads us to understand one reason why chemical action in the field usually falls short of expectancy and never produces the number of casualties which some writers in the popular Press are so fond of predicting. Another, and a very significant reason why more casualties are not produced in chemical warfare is the ease with which artificial protection against war gases can be applied and the marked efficacy of anti-gas training measures.

Despite the technical difficulties to which I have alluded as being inherent in applied chemical warfare, the fact remains that this type of warfare is potentially very deadly. Any modern army that has mastered this technique and has available ample chemical resources could, I venture to assert, impose its will on an opponent within a relatively short time if the enemy should be obliging enough to forego the use of gas masks and other protective equipment. But such equipment has to-day become standard with every first-class fighting force. And so long as chemical science is thus applied in the defence, as well as in the

offence, the deadliness of gas warfare in practice must remain in a measurable degree nullified.

This leads us to a discussion of the two distinct fields in which the services of the chemical scientist are to be applied in furthering national defence. It is the chemist who must evolve the compounds used in offensive chemical warfare. And the same chemist, or his prototype, must also devise the means of protection to be applied as an antidote against each war gas. These two spheres of activity are really much more closely related than is usually supposed. When in January, 1915, von Falkenhayn made the decision to use chlorine on the Western Front, he first made sure that the German Army was provided with adequate protective equipment. On 30th January, an order was placed with the Draeger plant for a thousand respirators which were delivered within two months. A total of three thousand had been produced and were in the hands of troops of the XVth Army Corps before the action of 22nd April took place. It will be noted that the Germans were not expecting a gas attack; they were preparing to deliver one. But no nation will undertake the offensive use of gas without first working out satisfactory means of protection against it. We can therefore dismiss as spurious any claim for a war gas against which no protection can be devised. In the first place, no such compound is likely to be developed; and if it were, no army would have the hardihood to use it, because the danger of self-immolation would be too great.

One of the basic premises of chemical warfare is, therefore, that for every gas there is an antidote, and that this antidote will have been developed before any new chemical agent is introduced in warfare. Having this principle in mind, it is possible to face at least more easily the prospect of newer and deadlier chemical agents being introduced in future wars. When these are developed, there will be at least the assurance that somewhere and somehow defence against them has been worked out. And because of the universality of modern scientific scholarship a nation can be confident that its own chemists, if they do not already know the answer to this particular problem, will soon be able to find it.

But the *threat* of new war gases is always with us. The general public is very sensitive on this score, and a section of the Press, realizing this, is ever ready to provide thrilling and readily accepted forecasts of mass slaughter by future gas warfare. The origin of a few of the stories thus produced may be of interest.

Some time ago a Chicago newspaper published an article by an "internationally known research chemist," headed "Scientist Tells of Gas That Can Destroy Armies." According to the article, he talked

reluctantly about the new poison gas, which, he said, is called cacodyl isocyanide—reluctantly, because his government had indicated that it did not wish to have the subject too much discussed. He claimed the gas to be so deadly that, although it was in the possession of all the great nations of the world, the rulers and military leaders would hesitate to start using it. The Chicago section of the American Chemical Society promptly undertook an investigation of this and other stories emanating from the same source, and published its findings in *The Chemical Bulletin* of January, 1929. The " internationally known research chemist " was revealed as a professional lecturer with a flair for the sensational. As a matter of fact, the cacodyl compounds were carefully investigated during the War and rejected as possible chemical warfare agents.

Fluorine nitrate is another compound that enjoyed its brief day as a 'newspaper' gas. This chemical curiosity was prepared at the Massachusetts Institute of Technology by Dr. George H. Cady and was discussed at the Cleveland meeting of the American Chemical Society in September, 1934. A reporter asked Dr. Cady some questions as to its possible use. He did not know of any use for it, but admitted that it was irritating, was a gas, and had exploded. That was enough for the reporter. So, in the news, it became a new war gas which could kill silently or cause devastating explosions; altogether a quite fearsome thing.

Recently quite a furore was worked up over a devastating chemical alleged to have been developed by an undergraduate of one of our Western Universities. This compound was supposed to render the gas mask ineffective by destroying the chemical filling in the canister. In investigating this matter we found the idea was the use of materials obtained from smelter smoke (in this instance sulphurous and sulphuric acids) for neutralizing the soda lime in the canister. Now a war gas that would break the standard gas mask canister of an enemy would upset the whole balance of gas warfare. But this breaking should be done by an agent which itself is really poisonous. This particular idea was advanced in an undergraduate thesis and was found buried in a mass of similar ephemera by a reporter on the prowl for a sensational story.

Of course no government can afford to overlook any of the recurring newspaper accounts of new and deadly war gases, even though the cry of " Wolf, Wolf ! " may be raised with discouraging frequency. It is scarcely credible that the first announcement of a really important military weapon will appear in public print, yet we never can be sure. So reports of this sort are checked—not by soldiers—but by chemists, who, in addition to their professional scientific training, have also some knowledge of the exacting demands which a chemical agent must satisfy

before it can be seriously considered for military usage. This is the rock on which so many otherwise acceptable products founder. For instance, it is easy enough to work up considerable excitement over the deadly potentialities of carbon monoxide. Here we have an extremely noxious compound, yet one of such low density that the maintenance of field concentrations with it is impracticable. This is very fortunate as it happens, otherwise we should be obliged to ban that most prolific producer of carbon monoxide—the gasoline motor—from our public highways.

I will not bore you with a lengthy discussion of the requirements which a chemical compound must satisfy before it can be standardized as a military agent, but the following synopsis of the more important of them may be of interest :—

(1) The agent must be very toxic ; or very irritant ; or produce a large volume of smoke ; or have incendiary properties.

(2) It must be stable in storage and reasonably stable in contact with moisture.

(3) It must be capable of manufacture on a large scale.

(4) Domestic raw materials must be available for its production.

(5) It must be suitable for loading in munitions and should have little or no corrosion on ordinary steel.

(6) The substance must be capable of vaporization or other means of dissemination, in sufficient concentration under field conditions, to produce the effect desired.

(7) If the substance is a gas under ordinary conditions, it must be easily compressed to a liquid, and easily vaporized when the pressure is released.

In addition to these absolutely necessary properties, it is highly desirable that a chemical agent possess the following characteristics :—

(8) It should be adapted to handling and transportation without special precautions.

(9) When disseminated as a vapour the density should be several times as great as air.

(10) It should be cheap to manufacture.

(11) It should be capable of quick production in existing commercial plants without extensive alteration in existing equipment.

We can never expect to find chemical substances that will satisfy *all* of these requirements. Yet they stand as criteria by which each candidate for consideration as a war gas must finally be judged, and

certainly no material can be accepted for such usage unless it conforms to the majority of these standards. The characteristic of high toxicity is, of course, of paramount importance in a war gas; but this must be supplemented by numerous other requisites often ignored by the general public but never by military authorities. It is one thing to discover acceptable war gases, and quite another problem to manufacture them on the very large scale necessary to meet the supply requirements of modern warfare. Chemical warfare is, in fact, a *de luxe* type of warfare, the waging of which is necessarily limited to nations in an advanced stage of industrial development. This is to some extent the reason why gas warfare has not made its appearance on the Spanish Peninsula or in China.

As a general proposition it may be stated that to-day most nations can and, in fact, are providing themselves with quite efficient types of anti-gas protective equipment; but there are probably not more than half a dozen nations possessing the industrial resources necessary to undertake aggressive chemical combat on a large scale. By chemical resources I mean the possession of suitable raw materials; the chemical plants for converting them through intermediate stages to what are actually fine chemicals; the technical skill to design and operate such plants; and, of course, the research and development personnel capable of keeping at least abreast of this constantly developing industry.

As the keystone of this arch of industrial leadership in the modern world stands the chemical scientist. I need not emphasize how important he is, in fact, how indispensable he is to our existence to-day; but the same basic factors which make the chemical scientist such an important figure in modern industry also make him an equally important figure in modern warfare. I have already suggested a unique type of chemical specialist who differs somewhat from the scientist who is contributing so much to-day to making daily life more pleasant and comfortable, and incidentally to lead his nation to its place in the sun of trade supremacy. I refer to the chemist who has specially studied the needs of military science, who has acquired some knowledge of how armies function in the field, and who therefore understands something of the particular and exacting requirements of chemical combat. This latter type is largely a post-war product; and although his numbers are few he has attained a position of real importance in national defence by serving as an indispensable link between military and chemical science.

This latter type of scientist has been grotesquely portrayed as a man working stealthily in a closed laboratory, searching with the fervour of a mediæval alchemist for a secret and deadly formula which will bring about the death of millions and the ultimate destruction of civilization.

I should like to present, by contrast, a more refreshing and, I believe, a truer picture of what military chemists are actually doing, with the assistance of their professional fellows, in the more general field of chemical science. These men are really drawing the fangs of chemical warfare; delimiting its deadliness; and bringing within controllable bounds what might otherwise be a very serious threat to modern society and the sovereignty of nations. Very efficacious protection against chemical warfare can be devised, and it is in the development of such protection that the chemist may be said to represent the protector rather than the destroyer of modern civilization. In this connection, I would call attention to the very realistic attitude which the British Empire has taken toward the threat of air-chemical attack, particularly against the British Islands. There is an obvious analogy between this menace and the one with which the Empire was confronted when during the War the submarine threatened to destroy British shipping. In theory, at least, both foreshadowed no less a disaster than the dissolution of the British Commonwealth—a proposition which could be most convincingly argued by paper strategists who failed to evaluate the possibilities of defence along with those of offence. Yet it has been very logically pointed out that the threat of the submarine to the Merchant Marine and the threat of aerial gas attack against civilian populations are each basically technical problems to be solved by the application of scientific defensive measures; and that since such measures were found effective in the case of the submarine, we may rely on science to provide equally effective solutions for the air-gas hazard. In fact, I feel satisfied personally that the prospect of an air-gas attack against Great Britain is to-day very materially reduced as a result of the active measures already adopted by the Air Raids Precautions Department of the Home Office.

Large-scale air-gas attacks against congested urban districts, while offering interesting speculative possibilities, have never yet been attempted on a grand scale; and those who have made a careful technical study of such operations declare that their value is at least questionable. In the first place, such an attack would require the use of hundreds of aeroplanes in a simultaneous attack. Even assuming that these aircraft were faced with little or no opposition and were able to reach their target and there release their loads, the cold fact remains that protection of the populace against gas is feasible. Shelter is desirable, yet a good mask will insure safety during attack with any lethal gas, such as phosgene. Against mustard gas, protection is also possible. First, stay out of mustardized areas; or, if one has been contaminated by contact with mustard, prompt washing with any solvent such as gasoline, alcohol or even plain soap and warm water will practically eliminate

the danger of serious burns. These remedial measures may not always be practicable, in which case numerous injuries must be expected. Yet obviously such careful planning as that now being done in Great Britain will go far towards minimizing both the number of injured and the extent of panic and public hysteria that would otherwise prevail.

These facts have long been recognized by technical men who have studied the pros and cons of air raids involving the use of gas. It remained for the British Government, however, to prove by actual demonstration that the protective measures recommended by the Air Raids Precautions handbooks were both practical and effective. The details of this experiment are set forth in a report issued in London last December and published in *The Times*. This was the first occasion, so far as I know, that a building was actually gassed under conditions simulating a wartime attack. Chlorine, mustard, tear gas and arsenical smokes were all used in large quantities, and the tests were much more severe than anything likely to be encountered during air raids. The experiments were carefully regulated so as to develop really accurate data—the publication of which was welcomed by every nation concerned with the possibility of aerial invasion. These tests demonstrated that a considerable degree of protection against war gases was afforded by an ordinary dwelling-house with doors and windows closed. In a room made airtight by the simple measures recommended in the Air Raids Precautions Handbook, No. 1, the use of a respirator was found unnecessary. Where the authorized civilian respirators were used in passing through the dense gas clouds outside the building, complete protection was afforded. The experiments were conducted by eminent experts not in Government employment, among whom were distinguished University professors and scientists. The significant facts they arrived at were :—

(1) Chlorine-type gas will penetrate very slowly into an ordinary dwelling—in this case, about seven minutes elapsed before it became necessary to put on masks. In a room made airtight by unskilled personnel, gas did not penetrate, despite the fact that an intense cloud was maintained for one hour.

(2) Mustard gas, under the most severe conditions of release, will not enter a dwelling in appreciable quantities ; and the amount of penetration into an airtight chamber is so insignificant that a mask need not be worn.

(3) Tear gas filters into closed structures—although here thirteen minutes elapsed before respirator protection had to be applied, and after three-quarters of an hour the concentra-

tion inside the house was still much lower than that outside.

(4) Arsenical smoke penetrates more quickly and will enter even a " gas-protected " room in a prolonged attack ; although not in quantities sufficient to cause serious injury, yet enough to be detected.

From these data the British Government substantiates the recommendations already made : use a respirator if out of doors when gas is released ; go indoors if you can ; and do not get excited. By following these simple rules, serious injury will in most cases be avoided.

Behind the very excellent work being accomplished by the Air Raids Precautions Department stands the chemical scientist, whose specialized technical knowledge is proving of utmost value to the Government. It required no little courage for political leaders to assume responsibility for the production of the many millions of gas masks now being accumulated in Great Britain for the protection of non-combatants ; not only is it a considerable expense, but the masks themselves must not be found wanting. For the latter the Government must rely on their technical experts, represented by the Chemical Defence Committee.

I hope I have not unduly stressed the work of the chemist as represented by the accomplishments of the British Air Raids Precautions programme ; yet this appeals to me as being an outstanding achievement in the field of national defence ; certainly it epitomizes the finest meaning of that frequently misused term. Only too often has " national defence " become in reality national *offence* ; and we all recognize that gas warfare may be utilized in future, along with other agencies of modern science, in furtherance of purely militaristic aims. However, if this comes about, democracy, having at its disposal patriotic men trained in the science of modern chemistry, will find reason to include them among its most important defensive resources.

THE DOCTRINE OF LIMITED LIABILITY

By Captain H. M. Curteis, M.C.,
Highland Light Infantry.

IN the late war Great Britain, for the first time in her history, put into the field an army on a continental scale. The killed alone from the armies of the British Empire numbered just short of a million. The greater part of this unprecedented loss occurred in France and Belgium and was occasioned by a combination of factors: the deadly power of modern weapons, the scale and duration of the fighting, and our unreadiness for a national war. The natural reaction to such appalling casualties has been to try to find a means, if we fight again in a great war, of avoiding them. In the tactical sphere no great progress to that end has yet been made. The fire power of the defence has grown in pace with the means of crushing it or of protecting infantry against it, and the tactical advantage to the defending side remains probably as great as in 1918. It is then to the realm of strategy that certain British military writers have turned in their search for a way of avoiding the slaughter of 1914–1918. The principal result has been the evolution of a theory propounded fairly often in the Press that the remedy lies in a return to British "traditional strategy"—consisting, briefly, in applying "pressure" on the enemy by air, sea, and financial power developed to their highest possible strength, and in the avoidance of putting a great army into the field. Britain, it is claimed, needs only to hold what she has and, if she can contrive to draw full benefit from the tactical advantage inherent in the defensive, she need not take the offensive on the ground, and so would not require the large army that it demands. If they agree with sending even a small Expeditionary Force to the Continent, these writers believe that it should be employed on an independent strategical task, based on our sea power, rather than used in direct co-operation with our allies as in 1914. Such appears to be the credo of the traditional strategists, and if the above is a very condensed summary of their reasoning, it is hoped that it is none the less a fair one.

We are a people amongst whom tradition is greatly honoured, and the very adjective confers some prestige on a doctrine which is attractive enough in itself. But in any such abstract theory evolved in peace there

is a danger that it may become considered—especially by the general public—as applicable to any European war in which we may be engaged, irrespective of whether it is the strategy most likely to bring victory in the given circumstances. That, after all, is the only criterion by which strategy can be judged, yet there are many possible types of European War in which we might take part and where the so-called traditional methods would be entirely unsuitable.

The doctrine of traditional British strategy contains two sets of implications; the one geographical, in the sense that it is advocated that we should employ the Expeditionary Force (if any) away from the scene of the main clash between allies and enemies; the other physical, in the sense of the low proportion of our total national strength which, it is urged, should be put into the Army, as compared with the Navy and Air Force. It is proposed first to examine the geographical aspect—sometimes referred to as "Amphibious Strategy."

The Limitations of Amphibious Strategy

The purest examples of traditional and amphibious strategy are to be found, presumably, in our wars of the XVIIIth Century when we subsidized our allies to fight France in Europe whilst we helped them by raids on the French coasts and ourselves to the French Colonies in America and India, isolated from their homeland by our command of the sea. When it came to making peace, France ceded her colonies to us the more easily because she regarded them as of secondary importance to securing or promoting her vital interests in Europe. But in the Napoleonic wars France had virtually no colonies and for the sixteen years until 1812 she had regularly and totally defeated our allies. Dominating all Europe, she was relatively insensitive to blockade. Our strategy then consisted in subsidizing her enemies, of blockading her as far as it was possible, and of making our principal land effort in the Peninsula. Can it be claimed that this strategy would have brought about Napoleon's defeat without what may be called the "act of Providence" of his gamble in Russia? His downfall was almost entirely self-encompassed when, by invading Russia, he lost both the *Grande Armée* and his legend of invincibility. Without Moscow could there have been a Leipzig and would there have been a Waterloo? The answer seems at best highly doubtful. British policy was perhaps an indirect factor in causing the Russian campaign, and "the Spanish ulcer" certainly contributed to Napoleon's decline, but the essential point of this argument is that seapower and subsidies could not, without the providential *folie de grandeur* which inspired the advance to Moscow, have been expected alone to win the war. In fact, the Napoleonic wars

cannot be quoted as an example of victory gained by our traditional methods. On the contrary, as a strategical problem, they bore a closer resemblance to the late war than to the campaigns of the XVIIIth Century.

In the war of 1914–1918, once the only real opportunity of using our sea power with probably decisive effect had been missed at Gallipoli, there was no other opening for the use of amphibious strategy. Sea power, through the blockade, was probably the greatest single factor contributing to victory, but there was no longer any serious alternative to concentrating our maximum strength in France. Gallipoli was a great opportunity mainly because victory there, by opening the way to technical supplies for Russia, would have enabled the Entente to exercise its full strength against Germany. Conversely, the ill effects of Russia's isolation need no elaboration. But once Gallipoli had failed, any alternatives to concentration in France were open to the crippling objection that the Germans could move a division to the Balkans or Italy more easily than we could and that a machine gun in defence is as powerful on the Isonzo as on the Somme.[1] In fact Vittorio Veneto and the Vardar were locally decisive only because the Germans, on the edge of defeat in France and needing there such reserves as remained to them, were unable to send help to patch the breach.

It may not be entirely coincidence that the last two major wars—the Napoleonic and the German—in which Great Britain has fought, have not been decided by " traditional " or " amphibious " strategy. As we have gradually become a more " satiated," as well as a stronger Power, the issues for which we would or need fight a major war have grown more likely to be confined to that of a dominant Continental Power threatening our own security. Such Powers are, *ipso facto*, liable to be relatively invulnerable to amphibious strategy. The British Empire, on the other hand, with the development of railways, submarines and air striking power, has become more sensitive—as the diversions in Mesopotamia and Palestine showed—to an enemy strategy of what might perhaps be called " indirect approach."

However that may be, the chances that our strategical problem in any future European war would more nearly resemble 1914–1918 than those of the XVIIIth Century appear too strong to ignore ; and traditional strategy applied in circumstances no longer traditional is likely to prove inadequate and perhaps disastrous.

[1] The French Official History, Tome IV, Vol. 2, states that the transport of one division from France to Salonika required four weeks, whilst the Germans could send ten divisions a month from West to East without upsetting normal transportation.

The Army's Part in a National War

Turning to the physical aspect, an article, " Does Defence mean Defeat ? " by Major E. W. Sheppard, which appeared in the May issue of the R.U.S.I. Journal, probably represents fairly the ideas of those who consider that the Army need not take the offensive in a great war in Europe. The article began with the words : " The question of what should be Britain's policy and strategy in a future great war in Europe has aroused considerable public attention." Before discussing Major Sheppard's answer to this question, his opening sentence deserves attention, for its wording appears symptomatic of the " defensive school's " over-theoretical line of approach. They are searching for a hard and fast strategical doctrine which is to be applied in the " next European war "—whatever form that may take. And we have already seen that the answer to the question, in its geographical aspect, depends so much on the circumstances of the particular war in which we may be engaged that it is impossible to lay down an *en tout cas* strategy applicable to any European war. The same applies to the question of the Army's method of employment and proportionate strength. We cannot define exactly the Army's role—much less restrict it to the defensive—until the strategical problem presents itself—which is usually not until the outbreak of war.

Major Sheppard, in advocating a defensive strategy for the Army, bases this doctrine on the thesis : " if we can hold what we now have we shall have achieved our purpose in any such war," and he therefore suggests that in any future conflict the Empire should possess a " fleet able to keep the seas, an army able to safeguard her land frontiers, and an air force which can carry the war into the enemy's country and exercise pressure on him to force him to abandon his aggressive purposes . . ." The significance of this statement lies, of course, in the role allotted to the Army ; it has only to safeguard our land frontiers and then the Air Force alone will take the offensive and, by bombing raids on his territory, induce the enemy to sue for peace. Whether the most powerful Air Force we could raise would be able to achieve this in all circumstances will be discussed further on. Affecting the Army's part in the scheme a vital question is : What are our land frontiers ? In 1934 Lord Baldwin defined one of them as being on the Rhine. The violation of Locarno, in March, 1936, certainly moved it a little further West, but on that occasion Mr. Eden as Foreign Secretary reaffirmed the vital importance to us of the Low Countries' integrity. These statements are quoted here as one outstanding example of cases where the frontiers of other nations may be strategically equivalent to our own.

But as they are not ours territorially, we cannot be directly responsible for their defence.[1]

Major Sheppard deduces, with complete logic, that if we have an army able to safeguard our land frontiers it need never undertake the difficult task of a land offensive—the enemy having failed in his offensive to rob us of any territory would come to realize that there was no hope of achieving his purpose. But can we be sure of holding the type of frontier mentioned above—for the defence of which we cannot be directly responsible? Even if we had an army strong enough to do so, once it had effected a junction with that of an invaded and weaker ally, could the latter hold out against possibly overwhelming odds until help arrived? If not, and an enemy once occupied such territory, we, for our own security, would have to expel him. The question is whether an extremely powerful air force, as a substitute for an offensive by a large army, could achieve this. It would exercise pressure on the enemy in two ways. Firstly, in the zone of his armies—presumably in co-operation with an offensive by our allies, plus the small British contingent—and secondly, against his industrial areas. The experience of the late war indicates clearly that direct air force action against the enemy's armies would not alone be sufficient to cause them to withdraw. In the early stages of the battle of the Somme in 1916, the Allies had as great a degree of air superiority as is likely to be attainable in Western Europe. The performance of aircraft has greatly increased since then, but so also has that of anti-aircraft defence. In the Spanish War, General Franco's failure to gain a decisive victory this summer is another indication that air superiority alone cannot compensate for inferior numbers on land.

There remains the question of whether continual and powerful air raids against the enemy's industrial areas would compel him to abandon the favourable position he had seized. Towns near coasts or frontiers are obviously more vulnerable to air attack because the warning they get is liable to be of the shortest; but the industrial bases of the great Powers of Western Europe are situated well inland compared with the Port of London. Under such conditions it seems doubtful whether the material damage and dislocation we could cause would cripple our adversaries' war industry. The moral effect on a well-disciplined people,

[1] "We have never been able, in all our history, to dissociate ourselves from events in the Low Countries; neither in the time of Queen Elizabeth, nor in the time of Marlborough, nor in the time of Napoleon; still less at the present day, when modern developments of science have brought striking force so much nearer to our shores. It is a vital interest of this country that the integrity of France and Belgium should be maintained, and that no hostile force should cross their frontiers."
(Mr. Eden in the House of Commons, 19th March, 1936.)

trained to expect and to protect itself against air raids, is unlikely to be decisive, especially if they were being told by their Government, however untruthfully, that the London area was suffering even more severely from their attacks.

Another difficulty in relying upon our allies to do all the dirty work on land is that a country with a relatively small population, such as France, might have the bitterest objection to making what she felt was a disproportionate sacrifice in lives to free both countries from a common danger. (It is worth remembering that France lost 1,400,000, or 3.37 per cent. of her population killed in 1914–1918.) Whether or not we sympathized with such an objection, its effect on the outcome of the war would probably be disastrous.

In the late war our role on land, arithmetically, was to redress France's 4 to 7 numerical inferiority to Germany. Had we shirked that role and adopted a strategy of limited liability, France would have been defeated by weight of numbers, and it is difficult to see how we could then have continued to fight alone. Moreover, to finish the late war in 1918, a large contribution of American manpower was needed in addition to our own, and had the German armies not been attacked and defeated in that year, they might have obtained supplies from Russia and Rumania sufficient greatly to alleviate our blockade. That is a point which seems to be ignored by some writers who deduce from the result produced by victory in the field plus the blockade that the latter by itself would be the winning card in a future war.

To re-state the problem briefly: can we be reasonably sure that we could prevent the Low Countries, for instance, from being overrun—or, if that is not certain, could we, once an enemy had occupied one of them, be sure of expelling him by air action alone? Unless the answer to one of these questions is an unqualified "Yes," we should prepare to meet the situation implied by a negative.

An Alternative Policy

Even if in peace-time we can create an army strong enough to protect our strategical land frontiers it appears more than doubtful whether it could arrive in time on the most vital one of them. Therefore, since the necessary counter-offensive would demand far greater numbers, we must prepare in peace greatly to expand the Army if war breaks out. Improvization, as the late war showed, is costly in lives as well as money.[1]

To discuss the form of Army expansion which we should prepare is outside the scope of this paper, but it is not intended to suggest that, in terms of manpower, it need necessarily be as great as in 1914–18. The

Field Force might consist of something like the three " Mobile," nine " Armoured " and six " Support " divisions suggested in the 1936 Gold Medal Essay of the R.U.S.I.—and adjudged prohibitively expensive. It would certainly have to be such an army if we were unable to raise a numerically strong one. For, as Colonel Beadon so truly wrote on the same subject: " If the nation is unwilling to provide its manpower freely it will have to pay for a privilege unique in Europe."

But whatever its form, our military expansion must be very considerable in its total power, if there is any chance of our having to reconquer lost territory. It is no use saying that the country would not stand it. The country would stand anything rather than defeat if the consequences of defeat—the post-war starvation of Vienna many times multiplied—were clearly put to it. To provide a continental army as well as a greatly expanded air force would certainly be a severe strain on our resources. But, as in battle a commander may sometimes deliberately strain his men to near breaking point—so in a totalitarian war we must be prepared to contribute all our resources from the day it begins. If they are not needed, then so much the better. But the consequences of the British Empire losing a major war would be so irreparable that it would be an ironical consolation to reflect that we had done so without incurring heavy casualties. It is not suggested that the directors of our policy are influenced by articles in this JOURNAL or in *The Times*, but many of the rest of us are, and at a time when moral rearmament is as important as material, it would be unfortunate if public opinion came to believe that the Army's role in war was confined to anti-aircraft defence. Still more so if, when the necessity arose to expand the Army, it was believed that men were being drafted to it only because obtuse Generals had not yet realized that the war could be won by air action alone. No doubt some wars could be, but the most dangerous could not and, unfortunately, " we make war not as we should like, but as we have to."

[1] " But another evil made itself manifest. The flower of the nation volunteered. Whole regiments were formed out of men whose education and ability fitted them to be capable officers. All that was most brilliant, gifted and glorious in our country hurried to the field, and the wounded returned time and again in virtue of their original voluntary engagement. Thus a great injustice was inflicted upon the best, and, moreover, a ruinous, unthrifty use was made of our strength."

(Mr. Winston Churchill, *Daily Telegraph*, June 9th, 1938.)

THE OFFICERS TRAINING CORPS

By Lieutenant-Colonel the Viscount Bridgeman, M.C.

On Wednesday, 23rd February, 1938, at 3 p.m.

Major-General E. K. Squires, C.B., D.S.O., M.C., in the Chair

The Chairman: I am sure that to most of you who are here to-day our Lecturer, Lord Bridgeman, needs no formal introduction. As an officer of the Rifle Brigade, and therefore one of the godfathers, so to speak, of the Tidworth Park O.T.C. Camp, and as a staff officer at Tidworth, he was brought into contact for many years with a great number of the O.T.C. contingents of both divisions. Then, as most of you know, for the two years ending last October he was a staff officer in S.D. 3 at the War Office, where his main concern was the O.T.C. Lord Bridgeman can therefore speak with a great deal of knowledge and authority on this subject, and he can speak with something more than that—he can speak with a deep personal interest in the welfare of the O.T.C. and with a firm belief in its value.

LECTURE

IT is always a little hard to believe that England can be ahead of the great militarist countries in any matter affecting readiness for war, but when, some time ago, I looked into the matter, I found that except for the United States, whose organization for training officers embraces the Universities, though not the schools, there is no other country which maintains an organization for the sole purpose of training young men with the object of fitting them to be officers, that is to say, leaders of other men, in the event of a national emergency involving war.

This is the object of the Officers Training Corps, and it is stated clearly at the beginning of the O.T.C. regulations—to afford a standardized measure of elementary military training to fit them to receive commissions on mobilization and, as a secondary but very important aim, to assure a supply of young officers to the Supplementary Reserve and Territorial Army in peace.

In the time available for this lecture, it would be possible to consider the O.T.C. either historically or critically, but not, I think, to do both thoroughly; so I have in mind to devote most of it to considering the problems of the O.T.C. at the present time, and those which appear likely to arise in the near future. I am not going to attempt to touch the Inns of Court, who for a time were called O.T.C.; formerly the Inns of Court Rifle Volunteers and now the Inns of Court Regiment. Their story is a different one; they have no direct connexion with the Universities or schools and their training problems resemble those of the

T.A., at least as much as those of the O.T.C. Nor am I going to touch on another big subject, namely, Public Schools Rifle Shooting and the Ashburton Shield; for while I would be the very last to deny its great importance from the point of view of National Defence, its problems are not quite co-terminous with those of the O.T.C., nor indeed do I think that they loom so large at the present time as some of the wider O.T.C. problems.

If there are any antiquaries in the audience who would like a little more O.T.C. history, they will find it in a book, "The O.T.C. and the Great War," by Captain Haig Brown, of Lancing, and in the report of a lecture given in this place in 1921 by Colonel Max Earle. The latter traced the origin of the O.T.C. to the writings of the poet Milton; he might perhaps with equal justice have gone back to Xenophon and the Cyropædia, but for practical purposes we had better begin in 1860 when the Volunteer movement produced the first Volunteer units in the Universities and Public Schools; some of the school corps were officially rated as Volunteers, despite their youth, and some as cadets, but you will notice that as yet there was no suggestion of training as officers; they trained as bodies of troops, and this tradition has been "an unconscionable long time in dying." I am not sure it is dead yet.

The next landmarks in the story are the first camps; Senior Division, 1872, and Junior Division, 1889; and so through the South African War up till 1907, the story is one of drills and camps, reviews and sham fights, but apparently not any great anxiety to discover "what they fought each other for." Change was to come.

After the South African War it had become evident that the arrangements for the provision of officers in that war had not proved adequate, partly because the necessary numbers were not forthcoming to meet the actual rate of wastage, partly because modern warfare was found to require in an officer not merely the qualities of leadership, but also previous training which had to be completed before mobilization in order to meet the wastage of the early months of war. Cambridge were first in the field, for they proposed in 1900 that the Volunteer battalion of the Suffolk Regiment, which they furnished, should be converted to a unit of several arms, for the specific purpose of training officers. Liverpool University had a proposal for a school of military studies in 1902, while Lord Lovat, in a paper dated 1906, produced a scheme which was in essentials the O.T.C. as we now know it.

The Ward Committee

This led to the formation, in 1906, of the War Office Committee on the provision of officers, under the chairmanship of Sir Edward Ward.

Lord Lovat was on it, with representatives from Oxford, and Cambridge, the present Bishop of Liverpool, then Headmaster of Clifton, the late Field-Marshal Sir Henry Wilson and Sir Thomas Hudson Beare, Convener of the Military Education Committee of Edinburgh University, a post which he still holds. Their terms of reference were to consider these various schemes, and they reported in 1907. May I say here how very deeply I have been impressed during my study of the subject by the vision, thoroughness and simplicity which characterize the work of the Ward Committee.

I am going to quote para. 13 of their report, because it is the charter of the O.T.C., and because if ever the O.T.C. has failed to fulfil its object it has been because some of the committee's intentions have been lost sight of.

"The existing system of school cadet corps affiliated to volunteer battalions and of University volunteer battalions and companies should be reorganized by the creation of a single body—the Officers Training Corps—not connected with any county or locality. . . . Cadet corps of schools would form the Junior Division, the Volunteer corps of Universities and University colleges the Senior Division. The separate existence, name and traditions of each corps should as far as possible be preserved as at present, but at the same time the committee propose by the grant of certificates of proficiency, and by the establishment of an instructional staff to improve and standardize military training at Public Schools and Universities. They further hope, by making the scheme of training progressive and interesting and by treating it as a definite system of preparation for a commission in some branch of the military forces of the Crown to appeal to the intelligence and patriotism of the members of the Corps. In order to strengthen the connexion between the school and university divisions and to emphasize the continuity of the whole course of instruction the possession of the school certificate A should exempt the holder on proceeding to the university from going over again such portions as he has already mastered."

You will notice that the committee refer to an instructional staff; this was to have its headquarters at the War Office and to have a strength of nine officers. The proposal was not approved, but from the idea has developed the scheme of regular assistance as it is to-day; notice too that the ideas of appeal to intelligence and continuity of training are all there.

Perhaps, too, it is not irrelevant to recollect that the Boy Scout movement was taking shape at almost exactly the same time.

So in 1908 the O.T.C. was born, and in 1911, 23,000 strong, it paraded before King George V in Windsor Great Park for a review which I

personally hope may be repeated in the present reign. Two Public Schools camps were held that year, and the present C.I.G.S. was Brigade-Major of the one at Aldershot. Military training in schools and colleges was set on a new course, though how much actual change in the training occurred between 1908 and 1914 it is a little hard to estimate.

The Great War

Then the War came, and the O.T.C. was tested. It had in the six years up to August, 1914, produced 3,600 officers for the Special Reserve and the Territorial Force—an average of some 600 yearly, which may be compared with the average for the last six years of 847. The contribution of the O.T.C. in the Great War itself is very difficult to measure with any accuracy. Some 38,000 ex-cadets of the O.T.C., including the Inns of Court, were commissioned up to March, 1915, and if we put the total commissions at 100,000 out of a total of 230,000, we shall not, I think, be far wrong.

To this one must add indirect contributions, such as the reduction of the training period for those who had O.T.C. training, and the value of the individual O.T.C. officers who during the War in many cases left their schools and colleges to serve overseas or if unfit staffed the Officer Cadet Battalions, while those that remained carried on the O.T.C. itself, for while naturally there was little to do in the Universities, the school contingents, with very little assistance, went full speed ahead. At the end of the War the O.T.C. was providing ten hours training each week for those boys between 18 and 18½, who on this condition were allowed to remain at school, and several voluntary camps were run, notably by Major Berwick.

As early as December, 1918, discussions began to go forward for the placing of the O.T.C. on its old footing, and the representatives of the Headmasters' conference seem to have accepted this without question. Looking back, it reads a little curiously that the Chairman should have said that the principal lessons of the War as they affected the training of the junior officer were the importance of musketry, drill and map reading in that order.

Post-war Reconstruction

It was most fortunate that, after the War, it fell to the lot of Colonel Earle to reform the O.T.C., for he had an intimate pre-war knowledge of the work, and the confidence of the educational authorities. So it came about that the organization of the post-war O.T.C. was on almost exactly the same lines as before; but conditions outside were very different, and most of the O.T.C. problems of to-day date from this time.

There was the inevitable reaction from war and its horrors and follies; there was the thought, fathered by the wish, that war could not come again, and the easy belief that membership of the League of Nations by Great Britain would ensure this for every individual without any further effort on his part; there was the intellectual and physical exhaustion, for a time, of those who had taken an active part in the War.

Finally there was no really clear indication from the War Office as to what form of training was required for the next war, especially as regards the infantry, and though great efforts have been made of late to sound the trumpet with a certain voice, it is useless to deny that just after the War there was no great incentive for the brave new world of students to prepare for the battle; and no one must blame them for seeking peace. Training arrangements left something to be desired; camps were very large, and the training of the individual became difficult, if not impossible; long marches and long waits were hard to avoid; the routine of inspections tended more and more towards ceremonial to the exclusion of tests of individual training, and the O.T.C. field day with its mobs of bewildered troops on Laffans Plain or Chobham Ridges remained unchanged in a changing world.

The Financial Crisis

This period of which I am speaking, which lasted till some three years ago, was also one of great financial stringency at the War Office; the cash grants in themselves were certainly adequate up to 1931, but little or no modern equipment was available for the O.T.C., or for that matter the rest of the army, and the training facilities were on the whole unconvincing to intelligent youth. In 1931, the financial blizzard burst with extreme severity on the O.T.C. The Capitation Grants for the Junior Division were heavily cut, the enrolment age raised from 14 to 15 years, the age for efficiency raised from 15 to 16 years, and the grant of £9, which had been given to contingents for each ex-member taking a commission in the S.R. or T.A., abolished; camps were suspended for one year, and their size cut down, so were the establishments of Contingents. It has been found since that the reduction in camp strengths and the raising of the age limit have had definite advantages in that smaller numbers have made it easier to modernize training, but after the blow the O.T.C. was down, and not far, as some thought, from being out. One cannot really be surprised if the Headmasters' Conference did, at that period, ask for a definite assurance that the O.T.C. was really wanted or if the authorities of some of the Universities replaced active support of the O.T.C. by, shall we say, impartial tolerance. The wonder is that the O.T.C. remained as good as it

did, for its supporters, like the Children of Israel, found it very hard to sing their song in a strange land; in fact, they have only recently begun to sing in a major key, to the infinite good of the cause. But there is a much brighter side to the picture. After the War, many of those who had left the staff of universities and schools to serve overseas returned to their posts, and a large number rejoined the O.T.C. or gave it active support in the common-room or on the Military Education Committee. These officers have been the greatest support to the O.T.C., not merely because of their experience of active service, but because they have upheld the cause of the O.T.C. often single-handed and in very adverse circumstances, and owing to the lack of suitable successors have had to continue serving long after they might have expected to retire. In the last two or three years the situation has manifestly improved, and outside academic support has revived to a marked degree: so it has been possible for the older officers to unbuckle their harness and hand over to younger men. We are, therefore, in a transitional stage as regards officers, and there is a shortage, more serious in the Senior Division, of 133. This officer problem is one of the most difficult in the O.T.C., and, in my mind, is vital. It cannot be said now, as a few years ago, that pacifism is preventing the young men from joining. The supply, if not abundant, would, I think, be adequate were it not for the many calls on the time of the young members of the staffs. After all, the man who is wanted as an O.T.C. officer is just the man who is wanted by everyone else; he is probably a games player; he is probably required to do research in addition to teaching. There is also the difficulty that the young members of his staff, especially in the Senior Division, are constantly moving, and are chary of taking up O.T.C. work when circumstances may arise at any time to prevent them continuing it. The problem can only be solved with the help of the school and university authorities: not, of course, by pressing unwilling victims into the service of the O.T.C., but by arranging, wherever they can, that the careers of those who volunteer for O.T.C. work shall not thereby suffer.

The Recruiting Problem

This brings us to the recruiting problem. The O.T.C., like every other military activity in this country, is run on a voluntary basis, and is designed for volunteers and not for pressed men. In the Senior Division this is clearly so; the question is, what are to be the incentives for him to join? Here we have the same problem as the Territorials have—serious soldiering versus what is called "the spade and bucket school": join the army, come to camp and have a jolly good time, and we will make you a soldier when you are not looking. The spade and

bucket school will always have its appeal to some undergraduates, but will it appeal to the most intelligent and sensible ones? I think not; such a policy is going to result in collecting a lot of cadets who do not mean business, and, as always, bad money will drive out good. On the other hand, the training offered must be made interesting and up to date; if it cannot be made so, we have no right to make an appeal to the intelligent undergraduate. We shall come back to training later on; meanwhile the endeavour is to combine the best possible training with reasonable amenities in camp and say, like King Henry V—"he that hath no stomach for the fight, let him depart." This is what was said last year in a new signal unit of the O.T.C. They enrolled 30 cadets; 16 did not mean business, and were soon asked to go. By camp time they had a strength of 29, and went to camp 28 strong; a sound beginning.

You probably know that while membership of the Junior Division is confined to members of the school raising the contingent, the Senior Division can take in extra-mural members up to twenty per cent. This is a useful provision, especially in the provincial universities, where the young man in business or a profession who has not been through the university can thus train himself for a commission. Like all good things though, one must take care not to have too much of it. In London, of course, gentlemen of that kind have the H.A.C., Artists and Inns of Court waiting for them, and so London University seldom take extra-murals. As a matter of interest, the strength of the Senior Division varies as a rule between ten and twenty per cent. of the available male undergraduates, that is to say, those who are of British nationality and European descent.

In the Junior Division it is not quite so simple. In most of the day schools, particularly those controlled by the Local Education Authorities, membership of the O.T.C. is really voluntary; but it is often alleged that the reverse is the case in the boarding schools. There is some truth in this, but it is to my mind no affair of the War Office. The authorities of the school have agreed to furnish the contingent; the headmaster is the man to decide what is good for the boys, and if he makes the arrangement that boys and their parents have to contract out of the O.T.C. rather than contract in (which is, I think, the most usual state of affairs in boarding schools), that is his affair. The War Office can only point out that the O.T.C. is voluntary so far as the War Office is concerned, and leave the school authorities to be the judges in this respect. There is a certain amount of periodical criticism on this point, and it has always struck me as a little odd that so much weight is always given to the opinion of the boys themselves. There is a passage

in the evidence given to the Ward Committee by the late Colonel R. S. de Havilland, of Eton, which puts the matter tersely :—

LORD LOVAT : Do you think there is any tendency to laugh at the thing ?

COLONEL DE H. : Yes : that is rather the tendency of the country at large and the boys at school copy what they see their seniors do.

GENERAL WILSON : Do the boys join the cadet corps for amusement or because they want to be of use to their country ?

COLONEL DE H. : Both, to some extent. It is a matter of school feeling whether it is the thing to join the corps or not.

I do not suppose that it is good form in many schools now to praise the O.T.C. openly, any more than to praise the school food ; it certainly was not in my time, just after this evidence was given. A much more serious charge is that membership of the O.T.C., or the hardships of camp, deter boys from joining the Regular or Territorial armies afterwards. But I have always thought that those boys who say so would find another reason if this one were not ready to hand, and I have tried to imagine the feelings of the parent whose boy said : " I wish you would not make me do arithmetic at school ; it quite puts me off the idea of going into the City." Another curious point is that things are sometimes held up as intolerable hardships in an O.T.C. camp when they would be accepted without a murmur in a Scout camp or trek.

May I also quote a passage from a recent book on Eton [1] which seems to be to the point :—

" One hears a good deal of foolish talk from time to time about O.T.Cs in schools leading to militarism. It is hard to believe it of any school, but of Eton it is preposterous.

" Overhearing casual talk, one would think that it was more likely to turn us all into pacifists and that everyone disliked the Corps. This is a pose ; it is not unpopular, and for all the grumbling that goes on, we get a lot of fun out of it.

" But it certainly does not inspire us with ideas of conquering the world. We merely tolerate our hour of soldiering."

One certain conclusion is that the better the training and the greater the appeal to the intelligence of the cadet, the fewer will be the complaints, and it is for the War Office constantly to pursue this end, leaving the system of recruiting in the hands of headmasters in the confidence that they will not force into the O.T.C. those who are temperamentally or otherwise genuinely unsuitable or unwilling.

[1] (BERNARD FERGUSSON—Eton Portrait).

Equipment and Training

When you have caught your hare, you should proceed to cook it, so let us now look at the problems of training. This, at the present time, is greatly complicated by the equipment problem. When the O.T.C. was formed in 1908, there was, compared to present-day conditions, very little equipment in the infantry beyond the personal equipment of the man. Artillery methods were extremely simple as compared with those in use now, and wireless almost unknown. Hence the equipment of the O.T.C. consisted, apart from a few guns, almost entirely of the personal equipment of the cadets. Its care and storage was a comparatively cheap and simple matter for the authorities of the schools and universities which had accepted responsibility for it. Nowadays the army is a changed place; even in the infantry, every man is rapidly becoming a specialist, and if the O.T.C. is to supply the sort of training for potential officers which the Army wants, it too must specialize. This is very clearly realized by the War Office, who also realize that the modern cadet would not in any case be ready to join the O.T.C. if he thought that the training he would get was on out-of-date lines. For these reasons the O.T.C. infantry was placed on the new platoon organization in October, 1936, almost at the same time as the Regulars and before the T.A. This has already given good results, for it has been found that the new organization of three homogeneous sections with the alternative equipments carried in the platoon truck give greater freedom of action and greater responsibility to the section leader, which is just what is wanted for O.T.C. training. The recent expansion of the Senior Division has been almost entirely in the direction of specialist arms; artillery, signals, R.A.S.C., survey and ordnance mechanical engineers, and the proportion of machine-gun units in the infantry has been very much raised; mortars have been authorized for the infantry rifle units, anti-gas equipment for the whole of the Senior Division, and not as before for medical units only.

Mechanization

Mechanization has had its repercussions on the O.T.C., which up to October, 1936, had remained entirely on a horsed basis, notwithstanding the rapid disappearance of the horse in the Regular and Territorial armies. For a number of years the artillery had been relying on regular draught horses for camp, and the last of these will disappear within the next training season or so. The artillery is being mechanized on a programme designed to finish by 1939, and while the cavalry at Oxford and Cambridge are keeping their horses for the present—they still meet a requirement on mobilization—the veterinary unit at the Royal Dick

College at Edinburgh was converted into a mechanized cavalry squadron last year ; a halfway house towards light tanks. This was rather a bold experiment, but from the experience of the first camp, fully justified. In fact, it is evident that while it is true that some undergraduates will join horsed units to acquire skill in riding, there are many others to whom the horse makes scant appeal compared to the motor ; so far the O.T.C. has made no serious appeal to them. The mechanized cavalry and artillery are being given instructional motor vehicles on their permanent charge on which to teach the cadets driving in term time. All this O.T.C. equipment has its place in the programme for the rearmament of the Army, just as the establishment of the O.T.C. and the proportion of the several arms in it depend, at bottom, on the requirements of the Field Force on mobilization and its wastage in the initial months of a war, until the time comes when those who begin their training after mobilization are ready to take their places as fully trained officers.

But although one may welcome these changes which are indeed inevitable if the O.T.C. is to survive for long, they do create a number of difficulties at the contingent end. In the first place, there is the difficulty of fitting all the subjects into the time which the ordinary keen cadet is able to give, reckoned at a maximum of 40 hours when preparing for Certificate B ; then there are the physical difficulties regarding the storage of equipment and its use by contingents which are situated in towns, of finding, for example, suitable places to drive motor vehicles across country or to fire the mortar. Most of these problems can be solved in time, but that of accommodating the vehicles is far from solved as yet, nor are we in sight of being able to introduce the tracked vehicle into contingents ; I leave you to imagine the public uproar which would follow if the War Office gave the Oxford O.T.C. a set of tanks for Christmas !

In the Junior Division we have the same sort of problems, though not so serious, for even in the modern army the recruit must begin on the square, and the junior division must begin with recruit training. But the mechanics of recruit training must be got through as soon as may be, in order that the cadet may be trained progressively, as an individual and a leader and by appeal to his intelligence and initiative.

In both divisions there are the problems of finding suitable ground for tactical training near enough to the contingent headquarters, and the expense of transporting cadets there, for the day is past when battles, even be they Waterloo, can be profitably fought on playing fields ; to some extent this difficulty is offset by the introduction of more tactical exercises without troops, and by the death of the old Public Schools Field day at Aldershot. This occurred in March, 1936, when it

was replaced by a series of attachments of units of about 250 cadets to Regular battalions. There were few mourners.

All these changes require extra work on the part of the contingent officers, and may I at this point pay my tribute to the way in which they have supported the burden. They are constantly finding that they have to reorganize their systems of training, and learn new subjects in order to teach them, for unfortunately the newer forms of training require more direct supervision by officers and cannot be left in the traditional way, for the Sergeant-Major to "carry on." This necessitates refresher courses for the sergeant instructors, which have now been authorized.

Capitation and Training Grants

I have mentioned the difficulties rather fully; may I now spend a moment in saying what is being done to help overcome them. In the first place, the finances of the O.T.C. have had an overhaul; the pre-1931 position was not restored as it stood, but approximately the same amount of money was put back into the O.T.C., though in different places. First, the Junior Division capitation grant was increased to meet the higher wages and prices, and was put on a sliding scale to give equitable treatment to the smaller and poorer contingents; for the same reason the old restriction on the spending of public funds on cadets under 16 in State-aided schools was removed, the result being an issue of rifles to every cadet in those schools; at the same time the age of enrolment was left at 15 years, but pre-O.T.C. training for those of 14 years and upwards was recognized in those schools which thought fit to undertake it.

Next, a training grant has been introduced on the lines of the Regular and T.A. training grants; this provides funds, which can only be used for training, to carry out modern training in and out of camp and on courses; to pay for transport, regular assistance and demonstrations where travelling is necessary; the administration of this grant is decentralized to commands and to contingents of the Senior Division so that the money can be placed where it can most usefully be spent and the best use made of local facilities with the least fuss. Lastly, a separate grant has been introduced for the maintenance of the motor vehicles in the Senior Division. All this involved an increase of £22,500 over the previous year in last year's estimates.

Next, a great deal of attention has been given to the regular assistance available for the O.T.C. throughout the year. The Senior Division had suffered from their affairs being over-centralized at the War Office, and it is already clear that they are becoming much better known in commands, and therefore easier to help.

Certificates A and B

Certificates A and B have recently been revised with two ends in view: first to eliminate some of the old-fashioned drill and weapon training so as to make room for more modern and interesting subjects without, we hope, increasing the demands on the time of the O.T.C.; secondly, to try and make the O.T.C. training progressive and continuous and avoid idle time or repetition of work during a cadet's service. The Junior Division training syllabus has had to be revised for the same reasons, and post-Certificate A training introduced. As I said before, there is some complaint that training in the Junior Division is not what it should be. Often it is not easy to trace the cause of complaint, but it is clear that in schools with a high leaving age all the holders of Certificate A cannot be employed as instructors. Those who are so employed will be gaining new experience, but the remainder must likewise be given new work, and not, so to speak, be asked to go round the course again after having won the race. So it is now the definite policy to encourage post-Certificate A training in suitable subjects in those schools where there are sufficient holders of Certificate A. Wellington have an artillery section; Rugby a survey detachment; a number of schools are learning the Vickers machine gun, and an arrangement has been reached with the Air Ministry by which air training can be given under this scheme provided the R.A.F. can offer suitable facilities locally. These schemes are all promising, but they are in their infancy and it will take at least a year to judge of their effectiveness. We have also increased, to the limit of present facilities, the accommodation at courses, both in and out of camp, to enable O.T.C. officers to keep ahead of developments and to fit the senior cadets in both divisions to act as junior instructors.

Lastly, great efforts have been made to afford the best possible regular assistance and demonstrations *at the camps*, and, to this end, to arrange for more continuity in the regular staffs; it is a pity that the O.T.C. camp period and the T.A. camps coincide, as the peak demand for regular assistance for both comes at the same time, but there is no choice in the matter, either for the War Office or the academic authorities. This, perhaps, is not always realized, and the difficulty of finding the right type of regular assistance at the right time is too often the limiting factor in our O.T.C. plans.

One direction in which improvement is being sought lies not with the Army, but with the authorities of schools and universities; it is the fitting in of parades with the educational time tables and, in the Senior Division, the arrangement of recruiting so that as far as possible the different units, gunners, sappers and the like, recruit from different

schools of the university so that parades may be fitted in with the time-table of each school.

In all the efforts I have mentioned, the War Office has constantly had the benefit of the advice, official and otherwise, of the Headmasters' Conference and the Central Organization of Military Education Committees; it has been quite invaluable and has helped those responsible to avoid a number of pitfalls.

Future Developments

So much for the present; what of the future, for it cannot be supposed that we are near completion of this period of evolution. "We are moving now, right enough," said a contingent commander to me the other day, "but I don't yet know where." Perhaps the critics of the O.T.C. will not mind if I remind them of Lord Baldwin's warning not to dig up a plant too often, merely to see how it is growing. I think it is fairly easy to forecast the trend of events in the Senior Division. We shall move ever further away from the old idea of a volunteer unit, and more and more to the training of the individual as a specialist, retaining parades and collective training in camp only to the extent required to give the cadet a picture of the unit he will be required to lead. The old-fashioned camp may develop into an attachment to the Regular Army, and the cadet may gravitate to the officers mess; and so make the contacts which are the preliminary to a commission in peace or war.

In this the Officer Cadet Reserve should help, for it has recently been extended to the Junior Division.

The Junior Division is a more complex problem, for in these days of much deference to youth it is necessary to realize that the Junior Division is inescapably a youth movement, whatever may be its origin or special purpose. It has in the past sometimes been regarded merely as the Junior Division O.T.C. in which boys are being prepared for military training. That has been the rule in the past, and I think it has resulted in far too much of what we may call "the training of the toy soldier."

This has led to the emphasizing of things like smartness on parade, which has involved an opposition to rationalizing of the dress for field work and a liking for close order drill which has led to formalized training and a failure to develop the intelligence and inquisitiveness of youth in the way the Boy Scouts set out to do, or the Ward Committee intended.

Or it has been regarded as primarily an organization to develop the fitness and intelligence of the boys at school, ranking it with the Scouts

and the Pioneer movement which in some schools has been introduced to make good the lack of an O.T.C.; if so, a large measure of physical training can be included in the syllabus and the camps run on more holiday lines.

Neither of these two courses appear to me to be satisfactory. In the first place, the O.T.C. was formed for the purpose of training potential officers, and as such an organization it is an integral part of our arrangements for national defence; this purpose alone justifies the spending of army funds on it, and the bespeaking of so much time, work and thought from the educational authorities. In the second place, it is a voluntary organization, whereas if I understand the Government policy aright, the measures for securing the physical fitness of the schoolboy, if not of his elders, are to be compulsory. It is, therefore, a disservice at the present time to link physical training too closely with the O.T.C., notwithstanding that the O.T.C. was the pioneer of physical training in many public schools, and is often directed by the same members of the school staff. Similarly, it would be unwise to attempt too close a parallel with the Cadet Force, which does not set out to train officers.

It seems to me that the Junior Division has a great deal to learn from the Scouts, just as the Hitler Youth have learnt from them, and something to learn from the original thought of the pioneer movements, just as they have learnt from the O.T.C. Thus, while keeping the military objects of the O.T.C., we should constantly seek to reintroduce those changes in training which make the cadet more self-reliant and more thoughtful, and if in the process we have to modify our organization or clothes, what matter. A small experiment in this direction was tried in a camp last year; twenty-four hours bivouacking, cooking and patrolling on semi-Scout lines, and it was a frightful revelation to me that hardly a boy could make tea on an open fire; but it was not surprising that there was a large queue of volunteers for the same thing next year.

The O.T.C. and National Defence

I have left one vital point till the last: it is the question that critics of the O.T.C. are so fond of asking—is the O.T.C. justifying all the effort and money which go to maintaining it: why not, in the words of one headmaster, "let the poor thing die." So there is the search for a yardstick to measure its efficiency. Some use Certificates A and B, not a bad one. It gives us a yield at present of twenty-one per cent. to establishment in the Senior Division and twenty per cent. in the Junior. This figure can be expressed in a different way by saying that in the Junior Division over ninety per cent. of cadets leave with Certificate A

from the large public schools with a high leaving age; in the smaller schools where the leaving age is often below 17, a figure of seventy per cent. would be good, especially when you bear in mind that the schoolmasters often have great difficulty in fitting in preparation for Certificate A with that for the school certificate; when there is a clash, first things must come first and the Certificate A comes off second best. At the Universities, it is unfortunately true that about thirty per cent. on the average leave without even Certificate A; this again is due to the difficulty of fitting in the examinations and the work for the certificates with degree examinations, particularly as regards the written certificate papers.

Or you can measure it by the number of Special Reserve and T.A. commissions taken in peace, which is, as I have said, an average of 847 in the last six years; during the last two years the average has been 1,197. This, I think, is rather a dangerous guide, because so many factors determine the possibility of taking a commission, besides keenness to do so. These are the nature and hours of work of the candidate, the likelihood of being moved to another district, nearness to a Territorial Drill Hall, and very likely money comes in too. It appears that the Ward Committee estimated that five per cent. of establishment of the O.T.C. Junior Division should take S.R. or T.A. commissions each year, and that twenty per cent. of cadets should get Certificate A. On a six years average to 1937, the commission figure was 3.3 per cent., but for 1937 it was 5.3, while as I have just said the Certificate A figure is actually twenty per cent. So I do not think the statistician need judge the O.T.C. too hardly.

Or you can discard statistics and attempt to measure it by its value in peace as a medium of educating youth in the virtues of discipline and power of leadership and in the necessity for personal effort in a country where every peace-time effort for national defence is voluntary. This is often claimed as a justification in the eyes of the school and college authorities for maintaining the O.T.C., and while it is not a complete justification, it is, so to speak, a valuable by-product of the O.T.C. machine.

Or again you can recall the services of the O.T.C. in the last national emergency and rely on its responding to the call next time, if next time ever comes, and can attempt to visualize the gap which would be created on mobilization if the O.T.C. did not exist. Surely nobody doubts that we can rely on the universities and schools to give the O.T.C. their active support and to furnish its officers, granted that the War Office will supply its requirements with a due sense of its importance in the plans for national defence.

DISCUSSION

LIEUTENANT-COLONEL F. G. POOLE: Could the Lecturer give us some information about schools which are partly O.T.C. and partly Cadet? In my county, Surrey, we have a school of that nature, which provides sixty boys for the O.T.C., and the remainder of the boys, nearly three hundred, are Cadets, affiliated to the Territorials. I am very much interested in this, because I have seen its development, and originally the battalion furnished a signalling section for the Territorials. It was the best battalion we had in the county, and the first winner of the Nation Cup. Then the War Office decided to form an O.T.C. from this battalion, which I see every year. Training begins when the boy is 12, and the battalion feeds the O.T.C. detachment, while first aid and signalling are taught before the boys join the O.T.C. I should like to have the opinion of the Lecturer as to how this scheme is working from his point of view.

CADET-LIEUTENANT E. G. MANDEVILLE ROE: There is one question that I should like to ask the Lecturer. As I understand the purpose of the O.T.C., it is to provide us with leaders. The essence of leadership is to possess experience in command, and the O.T.C., as far as I can see, does not at the moment give adequate opportunities for boys to be trained in the exercise of command. If I might give a practical example, it would be this. Consider the position of a platoon of the O.T.C., 32 strong, in camp for fourteen days. If it is a junior platoon it will not be in camp for fourteen days; but suppose it is. If all those cadets are going to take a turn at commanding the platoon, they will get less than half a day each, and that is assuming that no other kind of training at all is done.

I have a suggestion to make, which I put forward with the greatest diffidence, because I see the Secretary of the British National Cadet Association in front of me. My suggestion is based on a certain experience—individual experience, naturally, because there is no official support for this that I know of, but I do know of examples where it has happened. I suggest that an officer cadet of the senior division could very usefully hold, for part of his time at any rate, a commission in the Cadet Force—a temporary commission, if you like. It is not for me to say here what the reaction of the Cadet Force would be to such a step, though I think the Cadet Force would benefit also, but I do suggest that it would give the boys an opportunity of acquiring some knowledge of and facility in the art of command.

LIEUTENANT-COLONEL A. T. B. BIGNOLD DE COLOGAN: The Chairman referred in his opening remarks to the Rifle Brigade, and I cannot forget in that connection that one of the greatest personalities in the foundation of at least the senior division of the Officers Training Corps was Major Ronnie Maclachlan, of the Rifle Brigade, who really put on its feet the senior division at Oxford University and made it at Oxford in my day, as the Lecturer said, the fashion to join the Officers Training Corps, which really is all that matters.

I wish to speak more particularly on the question referred to in the précis of the lecture as "Toy Soldiers or a Youth Movement?" (I was delighted to hear the Lecturer's remarks on that point), and I speak more particularly from the point of view of an officer in the Territorial Army. Since the War and until very recent days every Territorial unit has been carrying on under difficulties, and unfortunately support from the one body in this country from which one might have expected support, i.e., the O.T.C., has not been forthcoming. The numbers of the men in the ranks have been weak. I can speak only of my own unit, because the Territorial Army is a very parochial army, but in all those years it has been most difficult to get young men who have served in the junior or senior division of the O.T.C. to

take a commission. I grant that many of the objections to which the Lecturer has referred have a good deal of weight, but we in the Territorial Army certainly have been left with the impression that we have not been supplied with those officers because of a defect in their training while at school.

If you will forgive a personal reference, four years ago I was asked to go to my old school and address the members of the O.T.C. on the subject of the Territorial Army. They were on parade when I arrived. The Commanding Officer was a retired officer who had served in a Guards Regiment during the War. The boys were extremely good on parade; they went through all the stampings and turnings which one can see any morning on looking through the railings at Wellington Barracks. They carried out "Right Dress" most beautifully. When I addressed them it was quite apparent to me that they had never heard of the Territorial Army before, and I think my address was productive of results.

I should like to say, however, that it is with the greatest pleasure that we in the Territorial Army hear from Lord Bridgeman of some move on the part of those who are responsible for the training of the Officers Training Corps, especially the junior division, to discard in future the sort of thing which I have just described and to take up what Lord Bridgeman called the Youth Movement as distinct from "toy soldiers." I am quite convinced that the future supply of officers from the Officers Training Corps will be increased if those methods are adopted and if drill and, if I may so put it, soldiering in its less attractive branches are modified in the O.T.C.

Major R. S. Hunter: I should like to ask the Lecturer whether anything is being done in the senior or junior division of the O.T.C. to foster interest in the anti-aircraft battalions of the Territorial Army.

The late Major E. Montague-Jones[1]: May I, at this meeting on a subject which has been my hobby for the last forty years (I have not missed a camp for forty years), ask you to pass a vote of thanks to Lord Bridgeman for his interesting lecture, for the way in which he has tackled a very big subject, and for the lucid way in which he has dealt with many of the problems that arise in connection with the O.T.C. I can speak also for headmasters, as I was a headmaster for thirty years. I should like, as the result of my experience, to make a few suggestions.

The object of the O.T.C. when it was founded was to provide officers for the Regular Army and for the auxiliary forces. It would have provided many more in the past, I believe, if it had not been for one thing, i.e., the question of finance. The public school boys and young men at the universities did not see why they should give their services, and give their money as well, and it cost them too much to take a commission. Lately there has been an improvement in this respect. The trouble is that even now an officer has to find too much money. The money is there, and he can get it, but, to put it plainly, adjutants and regimental paymasters change so much, and they haven't had time to learn their job. The whole financial system should be simplified; a man who takes a commission should be able to draw his pay through his bankers as we did during the War. One of them told me recently that he had to change his uniform when he was made an anti-aircraft officer. He is entitled to another £30 for this uniform; he has not yet collected that, although it has been owing to him for some months. It is that kind of thing

[1] Since this lecture was given, Major Montague-Jones has died, aged 74. He was one of the pioneers of his Junior Division O.T.C., and never missed a camp, acting as Mess President each year to the end and running the O.T.C. Club and the O.T.C. Battlefield Tour.

which business men object to. Many of the boys at school have fathers who are business men, and they say: "Well, if I carried on my business like that I should never keep a single clerk."

Another suggestion I wish to make is that there should be an extra grant. Money has to be spent on ammunition and stores, and so forth, but I think the essential man-power should have a little more money spent on it. I suggest something of this kind: that there should be an efficiency grant of one guinea for subaltern T.A. officers for every 20 extra drills over the minimum required for proficiency. That would cost very little, and it would help the really keen boys very much.

CAPTAIN J. A. MOOR: The Lecturer and one of the speakers in the discussion gave us a very good hint when they suggested that we should have a little less of the "toy soldier" and a little more of the Scout movement. We schoolmasters would welcome some suggestion from the War Office end that we should discard our uniform on occasion and turn out in shorts and crawl about like Scouts, and go out and cook our own meals and have our week-end camps, and that those things should be supported by the O.T.C. At my school we have a week-end camp to which boys, whether members of the O.T.C. or not, come. We find that the boys in the O.T.C. are the ones who can cook, and those who are not in the O.T.C. are the boys who cannot. I do think that, if we could do more of that with the support of the War Office, and the War Office would allow us something towards that sort of thing, it would help a little.

Why should not we have our own O.T.C. book of scouting and our own O.T.C. book of games? If we could have help more on those lines, I think we should find more recruits in the day schools.

SIR LIONEL FLETCHER: I should like to refer to the effect that the O.T.C. has had on the Bisley Rifle Meeting. When I went to Bisley first, in 1893, the entries for the Ashburton Shield were 25, and for the Veteran Competition for Old Boys 12. In 1937 the entries for the Ashburton Shield were 82, and for the Old Boys' Competition 110 teams of five each. The average for the last five years has been 81 and 108 respectively. When the O.T.C. was founded in 1908, the War Office asked the National Rifle Association whether they did not think it would be a good plan to permit every school supporting an O.T.C. to enter for the Ashburton Shield. The answer was in the affirmative, and I think the results which I have mentioned are highly gratifying.

MAJOR J. M. WEST: There is one rather important point which the Lecturer has not quite brought out—that is, the question of the *officers* of the Officers Training Corps. Nowadays it is very difficult for them to get adequate time for preparation, a difficulty which is increased by the greater intensity of training. As far as I know, no way has yet been devised of convincing headmasters that if the thing is to be done properly a very considerable amount of time must be spent on this preparation. It has to be done at the present time on the top of the ordinary timetable by masters who are paid primarily to teach French grammar, Latin translation, Physics and so on. I do think that, if we are to get the best results in the shortest possible time, the people who are concerned with the training of Cadets ought to have some kind of opportunity given to them for the extra time they require for preparation.

THE LECTURER:

First of all I will deal with the two points raised by Colonel Poole and Cadet-Lieutenant Mandeville Roe which deal with the relations between the O.T.C. and the Cadet Corps. It is not very easy to answer Colonel Poole's question, because the

relations between the Cadet Corps and the O.T.C. contingent do not follow, as far as I know, any particular pattern, but depend entirely on the type of the school and on the ideas of those who are responsible in the school. I think I can go no further than to say that, as a rule, if the two exist together, the Cadets deal with the junior boys and pass them on to the O.T.C. I think that certainly works well for the O.T.C., and it probably works reasonably well from the point of view of the Cadet Force. I only know of one case where the two run parallel with boys of the same age—that is to say, the O.T.C. doing what might be called the straightforward work and the Cadet unit possibly specializing in signalling—namely, one school in the London area, which only recently formed an O.T.C., and it is too early yet to say whether that is going to be a success or not.

Cadet-Lieutenant Mandeville Roe raised a point, which I think connects up with Colonel Poole's point, about Cadets being commanded by O.T.C. Certificate A candidates. He is quite right in thinking, of course, that anything which can be done to give the O.T.C. Cadet more experience in command is welcome and beneficial to the O.T.C. Cadet. Therefore, so far as I can see (I cannot speak officially for the War Office), there would be no objection whatever to the Cadets being commanded by an O.T.C. Certificate A candidate, provided that the Cadets are doing the same work as the O.T.C. candidate ought to be doing.

I thought that Cadet-Lieutenant Mandeville-Roe was a little hard on the O.T.C. in regard to this question of experience of command. It is not the case, for example, that the O.T.C. cadet goes to camp only once in his service. He ought to go twice, if not three times, and if he goes as a junior cadet is it really reasonable to expect him to take command in his first year ? Moreover, there are plenty of opportunities for the cadet to take command in term time, and the test as to whether or not the cadet has in fact reached a proper standard of leadership and command of men is the test for the Certificate A practical examination, which is watched very closely by the War Office. None the less, I do very heartily agree with him when he stresses the importance of every available moment being spent in preparing the cadet to command.

With regard to Major Hunter's question, I think perhaps two points arise. First, as I did mention in the early part of my lecture, the primary object of the O.T.C. is to provide a reserve of officers for the Regular Field Army on mobilization. The secondary object, as we all agree, is to provide officers for the Territorial Army and the Supplementary Reserve in peacetime. I hardly think, however, that it would be right or possible for the War Office officially to stress the needs of any particular branch of the Supplementary Reserve or the Territorial Army at any particular time. Major Hunter perhaps knows that each Territorial Association has been invited to co-opt a member representing the O.T.C. (and I think most of them have done so), with the idea that that member shall form a link between the Association and the local O.T.C. contingents, in order to find out the immediate requirements of the Territorial Association for young officers and to pass them on to the O.T.C.

I should not like to say very much with regard to Major Montague-Jones' remarks on the finance question, although I do thank him very warmly for what he said about myself. I should like to confine my reply to saying that the financial questions to which he referred are the very close concern of the War Office, that there are several representatives of the War Office here to-day who may care to take a note of what he says, and that he knows his way into their domain sufficiently well to go and remind them if necessary.

I was extremely glad to hear Captain Moor say that St. Dunstan's College is putting up a better record in cooking in the field than the school that we chose. None the less, I am very glad that we chose the school which we did, which shall be nameless, rather than St. Dunstan's College, because, had we chosen St. Dunstan's College, we should never have discovered the great necessity for other schools to reach St. Dunstan's standard.

With regard to Major West's point, I had intended to emphasize that, and if I did not make it quite clear I think it is extremely well that Major West made it clearer. I do agree with every word that he said. We realize that all the changes we have made have been extremely onerous on the O.T.C. officers, and we realize that under the new scheme of training the matter cannot, as I have said before, be left to the sergeant-major, as in the days of old. This new training is being introduced, not because of any fancy or whim on the part of the War Office, but because it is the sort of training which is thought necessary for the Army at the present time if it is to be of use in the next war. Therefore the changes in the O.T.C. are being made by necessity and not by any particular choice. None the less, they will not be effective unless it is possible for those members of school staffs who are O.T.C. officers to have adequate time for preparation, and for this purpose I feel that the War Office must represent the case strongly to the Headmasters' Conference and other bodies, and rely on their appreciation of the situation and their goodwill to make the necessary adjustments in the school timetable.

THE CHAIRMAN:

The Lecturer and those who have spoken in the discussion have covered the ground so well that there is very little left for me to say.

There was one omission in the lecture which I should like to make good now. As most of you know, I think, in all these advances which have been made during the last few years in O.T.C. training and in bringing about the greater help, financial and otherwise, that the War Office and the Regular Army generally have been able to give to the O.T.C., no one has played a greater part than the Lecturer. He is one of a small band of officers who set themselves to work when they came to the War Office to help the O.T.C. as much as they could and to put its organization and its training on a better footing. I cannot, unfortunately, claim anything like the close acquaintance with the O.T.C. that the Lecturer possesses, but in the last year or two I have had opportunities of seeing a good many contingents in one way and another, and I have not the slightest doubt that what this band of officers to which I have referred has done, and what others are still doing now, is bearing fruit. I am quite certain that the O.T.C. itself would agree with me in that. Therefore, for what the Lecturer has done for the O.T.C. generally, as well as for his lecture this afternoon, I would ask you to accord him a very hearty vote of thanks.

The customary votes of thanks to the Lecturer and Chairman were accorded by acclamation.

YOUTH AND NATIONAL DEFENCE

By Lieutenant-Colonel F. G. Poole D.S.O. O.B.E. D.L.

AT this juncture it is not unprofitable to consider the future influence of our youth in a disturbed world. Critics may ask whether an atmosphere of ante-natal care, maternity benefit, free education with medical supervision, health insurance, unemployment benefit, juvenile centres, technical schools, etc., can inculcate any obligation to give service to the State? Are not our people "spoon-fed" from cradle to grave? Is not failure to profit by these immense advantages instanced by the lack of skilled labour in spite of unemployment, by many "work-shy" youths, and by the reluctance of girls to undertake necessary domestic work? As no compulsion exists, do not these young people lose their morale and become a burden on the highly taxed and long suffering public? Do not others, untouched by poverty in their homes and with the facility for amusement and so-called pleasure, maintain: "If work I must, give me a job suiting me in every way, strew my path with roses, and give me a good time." Does such an outlook show any realization that modern war involves a whole nation—men, women and children, or give any indication that some sacrifice is needed to prevent such a catastrophe?

Hard words surely, and however much truth these criticisms may contain, cannot something constructive emerge on the part of those who do not share in this fool's paradise of youth? Is it not true that countless voluntary organizations exist representing Youth Movement? Yes, supported by a generous public, but generally speaking uncoordinated and only dealing with a fraction of the youth of the country. A brief examination of some of these admirable organizations is useful. (In this article only those affecting boys can be dealt with.)

(1) *The Boys' Brigade*, founded in 1883 by Sir William Smith, is the senior boys' organization, with the object of combining discipline and religious training. Strength—about 120,000 officers and boys, with 55,000 juniors in The Life Boys.

(2) *The Church Lads' Brigade*, founded in 1891; uses drill and physical training with religious instruction for character training.

Both these organizations were in the Cadet movement, but since the Great War have withdrawn from it, the latter within the last three years.

(3) *The Boy Scouts*, founded in 1908 by Lord Baden-Powell, need no description, and their membership exceeds 2,812,000 in all parts of the British Empire, with representatives in many other countries. Rover Scouts, often of "military" age, have been added to the organization. Incidentally a general appeal for funds to support the movement has been made.

(4) *National Association of Boys' Clubs*, originating from Working Lads' Institutes as early as 1876. Total membership, 143,000.

Members of all these organizations rendered valuable services during the late War both at home and in the field.

A Juvenile Organizations Committee appears to have been formed in 1917 by the Home Secretary, but is now dealt with by the Board of Education, and no Federation of Brigades, Scouts, and Clubs has yet materialized. In addition, the National Fitness scheme is making an appeal to the young, but at the present time the activities of these so-called "non-military" bodies appear to be unco-ordinated. It is obvious that such co-ordination would make a distinct contribution to National Defence.

Organizations engaged in training the young for National Defence are varied in character, and receive some support from the Government.

(1) *The Navy League*, recognized by the Admiralty, and engaged in training Sea Cadets.

(2) *The British National Cadet Association*, recognized by the War Office, with units affiliated to the Territorial forces, and a strength of about 20,000. Ages between twelve and eighteen.

(3) *The Air League*, recognized by the Air Ministry and now raising Air Defence Cadets. The work of the Navy League and Air League is being co-ordinated, and a Civil Air Guard is being formed.

(4) *The Air Raid Precautions* under the Home Office, assisted by *St. John's Ambulance Association* and *The Red Cross Society*.

(There is also the recently formed *Army, Home and Empire Defence League.*)

Though all the first four organizations named receive some Government support, there is no provision made to bridge over the time between leaving school and reaching "military" age by national service. Close co-operation between all these organizations would prevent overlapping

and produce a National Cadet Force (Navy, Army, Air Force, and Air Raid Precautions) available in their localities in case of emergency, and as boy reserves. Moreover, the formation of specialist sections in Cadet Units assists Territorial recruiting.

While it is obvious that the subject of National Defence should be included in every school curriculum, the National Union of Teachers apparently are reluctant to include talks on the Defence Services in talks on other careers, and such a limited outlook does not assist the young in realizing their responsibilities. The system of Cadet and Citizen Forces in vogue in Australia from 1908 to 1914 provides an example of how National Service can be carried out where the principle of universal liability to be trained exists. Therefore, where the voluntary system still exists, Defence forces can only be maintained at full strength where education teaches the young their responsibilities, and where voluntary effort is co-ordinated and receives adequate support. In such a case the individualism on which we pride ourselves becomes originality in a common cause.

It is not proposed to contrast our present Youth Movement with those of other countries, notably Germany, Russia, and Italy, which are officially run on a gigantic scale and are compulsory. (In addition the Sokol Movement in Czechoslovakia is worthy of consideration.) But under a compulsory system for the young it will be remembered that obedience is unquestioning and that happiness may follow. In the case of service voluntarily undertaken, still greater happiness may follow.

But pious hopes are not enough, and it may well be asked how co-ordination between the non-military youth organizations and those for National Defence can be brought about? Many would answer: "Only by the close co-operation of the War Office, Admiralty, Air Ministry, Home Office and Board of Education. Moreover, is there not a Minister for Co-ordination of Defence?" All true, but in default of such a counsel of perfection, what else can be done?

History tells how often our countrymen have forced the hand of government. It is therefore humbly suggested that in each county an effort should be made to form a co-ordinating Committee of non-military Youth Organizations and those of National Defence, who could work out a scheme for mutual assistance. While each organization would retain its complete independence, the variety of interests would attract a greater number of boys, and identity of ideal would improve the value of training. This would stifle any wails for unfettered individualism, for much of the training of all organizations is similar. Difficulties present themselves, but with a common aim and good will on all sides much can be done. "Vires acquirit eundo."

THE CONSTITUTION AND FUNCTIONS OF THE CADET FORCE

By CADET-LIEUTENANT E. G. MANDEVILLE ROE, Adjutant, 6th Cadet Battalion, The Essex Regiment.

THE Cadet Force, after many vicissitudes and much neglect during the post-war years, to-day possesses official recognition and support from the War Office, and its place in the whole picture of national defence, though many would regard it as being but a small one, is nevertheless generally realized. The objects of enrolling boys in cadet formations were laid down by the British National Cadet Association some years ago as being " (*a*) To give mental, moral and physical training to lads, and so to form the character of each as to enable him to make headway in life; (*b*) to develop in them principles of patriotism and good citizenship."

These aims were formulated at a time when it was not fashionable to advocate preparation for national defence, and work among cadets was loudly condemned as being " the militarization of the young." At that time the Cadet Force did not possess Government recognition, which had been withdrawn, and units were not allowed to wear the King's uniform. The British National Cadet Association, under its President, the late Field-Marshal Lord Allenby, administered the Force and was the central authority.

To-day the War Office accords recognition to the Cadet Force, but the British National Cadet Association remains in being and discharges all its former functions. *The Schedule of Conditions, etc., relating to the Official Recognition of Cadet Units in Great Britain* lays down that " the authority recognized by the Army Council as responsible for the organization and administration of cadet corps is the British National Cadet Association. Official recognition is restricted to units enrolled in that Association." A financial grant of five shillings per annum per efficient cadet is made by the War Office. Of this sum four shillings goes to the unit, and the other has to be devoted to local administration costs. In addition the War Office allocated annually £750 to the British National Cadet Association to cover the increased expenditure of the central headquarters. These grants are confined to those cadet units which are affiliated to the Territorial Army. The Cadet List for 1938 gives 162 such units, of which 80 have received the sanction of the War Office

to wear military uniform.[1] Locally the organization of the Cadet Force is very similar to that of the Territorial Army. There are forty-two County Cadet Committees in England, nine in Scotland, and one each in Barbados, Bermuda, and St. Vincent ; the President of a County Cadet Committee is usually the Lord Lieutenant of the County ; the honorary secretary is very often the Secretary of the Territorial Army Association for the county.

The Cadet Colonel Commandant

The executive chief from the military aspect is the Cadet Colonel Commandant for the County. His duties are more directly concerned with training. He is a most valuable person psychologically. It is laid down in Army Council Instruction No. 250 of 1937 that each officially recognized Cadet unit must be inspected annually by either the Cadet Colonel Commandant for the County, a senior Regular Army officer, a Territorial Army brigade commander, a field officer or adjutant of a Territorial unit of the same arm of the service, or a Regular Army officer on half or retired pay. His duties as inspecting-officer enable the Cadet Colonel Commandant to get round his County and see the work of all the units under him, and to make the personal acquaintance of the officers, a very valuable thing both to him and to the units.

The Cadet Force is not limited to infantry, although that arm forms the largest part. There are sixteen cadet units affiliated to Territorial units of the Royal Artillery, fifteen to the Royal Engineers, one to the Royal Corps of Signals, one to the Royal Army Medical Corps, and two to the Royal Army Service Corps ; the remaining 129 affiliations are all infantry. The majority of the batteries of Royal Artillery cadets are linked to Field Brigades, but there are Heavy, Medium, Howitzer, and Anti-Aircraft units as well. The Royal Engineer cadets include Divisional, Fortress, and Searchlight formations.

The number of cadets and ex-cadets who subsequently enter the armed forces of the Crown is impossible to compute, as a great many do not pass directly from their Cadet unit into the Services ; but those of whom we can keep trace, though they form only a small proportion of the whole, provide a sufficient indication of the value of the Cadet Force as a recruiting medium. The latest official figures are those for the Cadet Year ended 31st October, 1937, and during the previous twelve months 1,052 cadets went from the Cadet Force into the Services. The total strength of the Cadet Force is about 20,000, and of this number probably less than one-fifth attain each year an age at which they are eligible to join the Services. The records of individual units tell their

[1] Arms for drill purposes, both rifles and guns, are provided on loan. The Long Magazine Lee-Enfield is shortly to be supplemented with a supply of rebuilt Short Magazine Lee-Enfields, and the Artillery will have 13-pounder Q.F. guns.

own story. During the same period as that given above, the 1st Cadet Battalion—The Queen's Own Royal West Kent Regiment, sent sixty recruits into the Services. This battalion has a strength of approximately two hundred and fifty. The 1st Cadet Battalion—The King's Royal Rifle Corps, contributed thirty-seven. These are not isolated examples, and one finds that local conditions have a certain influence upon cadets as to whether or not they elect to join the armed forces. Of the ex-cadets who join the fighting Services, the major portion enter the Territorial Army. A certain number go to the Regular Army, while the Royal Navy, Royal Air Force, Royal Naval Volunteer Reserve, and Auxiliary Air Force absorb some. There are always a select few who take commissions.

Annual Camps

The principal feature in the training of cadets is their Annual Camp. The Government assists in this respect by the free loan of camp equipment, but it has sometimes been found that the cost of transporting the material, a charge which the cadet unit has to bear, is heavy where the camp-site is a long distance from an Ordnance Depot. Some units still prefer to make use of civilian contractors on the ground of economy. The majority of cadet units camp independently, but there are some brigade camps, notably from time to time those of London and Middlesex. The largest Cadet Camp each year is always that of the Public Secondary Schools Cadet Association, which contains contingents from numerous schools. It is able to form two battalions, has its own well-organized hospital, runs Certificate A classes and large-scale field operations. In 1936 there were eighty-eight officers and over a thousand cadets in the camp.

In practice the Cadet Force is fulfilling a function nowhere laid down for it in specific terms. It supplies excellent potential N.C.Os. Before the War, when the Cadet Force numbered 200,000, as against the 20,000 which is its present approximate strength, we could say with truth that while the Officers Training Corps supplied officers, the Cadet Force supplied other ranks. To-day that position has been altered, and we find that the N.C.Os and specialists of the Territorial Army are often men who began their military training in the Cadet Force. One example where a Territorial battalion has drawn all its drummers and the Drum-Major from the affiliated cadet battalion will illustrate this. In another case many of the signallers are ex-cadets. The Cadet Force at present, therefore, appears to function as the breeding-ground of N.C.Os and specialists rather than of the other ranks. It is natural that this should be so, since the cadet of to-day is always a very keen fellow. If he were not he would soon leave the Cadet Force, which thereby acts as a means of weeding out and refining the stream of recruits for the armed forces of the Crown.

THE GERMAN NAVY OF TO-DAY

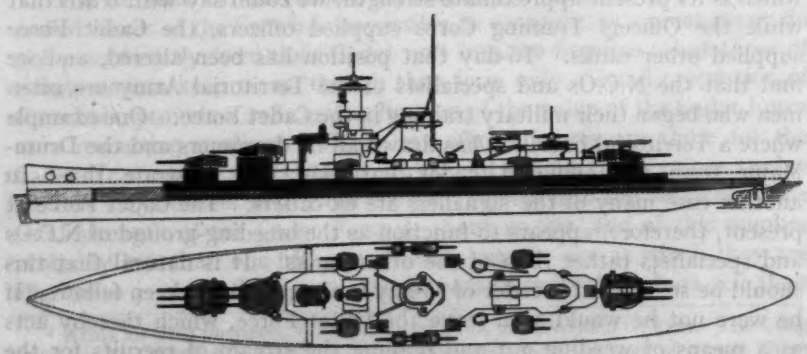
By Francis McMurtrie, A.I.N.A.

Sketches by courtesy of *Jane's Fighting Ships*

IN comparison with its strength in 1914, the German Navy of to-day makes but a poor showing. When hostilities opened twenty-four years ago, there were in commission forty capital ships, including eighteen belonging to the "Dreadnought" era. Cruisers numbered fifty, nine of them being armoured ships of from about 9,000 to over 15,000 tons. There were also some hundred and fifty destroyers and thirty submarines.

Battleships

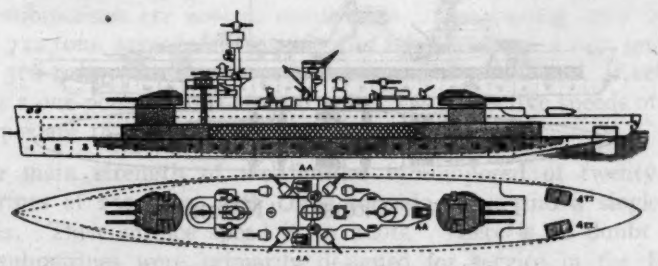
To-day, Germany has in commission only two capital ships which can be compared with those of other nations—the "Gneisenau" and "Scharnhorst." Of a standard displacement of 26,000 tons, they are the biggest warships ever built in Germany. Each of these ships mounts nine 11-in., twelve 5.9-in. and fourteen 4.1-in. A.A. guns. There are no torpedo tubes, but two catapults (one being mounted on the after turret) and four aircraft. It is believed that the speed is little, if at all, inferior to that of the French battleships "Dunkerque" and "Strasbourg," i.e., it is in the neighbourhood of 30 knots. An examination of the weights that would be required to meet these requirements leaves an approximate allowance of about 11,000 tons for the armour protection, including the turrets. It is therefore probable that the belt of armour shown in the accompanying plan is from 12 to 13 inches thick



The Battleship "Gneisenau"

at the water line over a very considerable part of its length, diminishing to 3 or 4 inches at the bow and stern. It is presumed that the turrets will be of 12-inch thickness, and the decks 6 inches.

Until recently Germany's main strength consisted in the three armoured ships "Deutschland," "Admiral Scheer" and "Admiral Graf Spee." These so-called "pocket battleships" were designed with a view to extracting the utmost value obtainable from the standard displacement of 10,000 tons, to which they were restricted by the Peace Treaty. The side armour is only 4 inches thick, with a further 1½ inches internally; the turrets 7 inches at face, 4 inches at the base, and from 2 to 3 inches at the sides; and the deck from 1½ to 2¼ inches thick, increased to 3 inches over the magazines. These ships cannot therefore be counted as battleships, nor are they so rated in the German fleet classification, which describes them as *Panzerschiffe*. Perhaps the best classification is one that reckons them as heavy armoured cruisers, since they mount six 11-in., eight 5.9-in. and six 4.1-in. guns. There are eight torpedo tubes, a catapult and two aircraft. Most remarkable of all is the system of propulsion, which comprises eight sets of compressorless double-acting two-stroke Diesel engines of the M.A.N. type, each set giving 6,750 B.H.P. at 450 revolutions per minute. Each group of four engines drives a single propeller shaft through Vulcan gearing, which reduces the speed to 250 r.p.m. The total horse power is thus 54,000, giving a speed of 26 knots and a radius of action of 10,000 miles. The hulls are electrically welded, by which means a further saving of weight is effected. The cost of each ship was approximately £3,750,000.



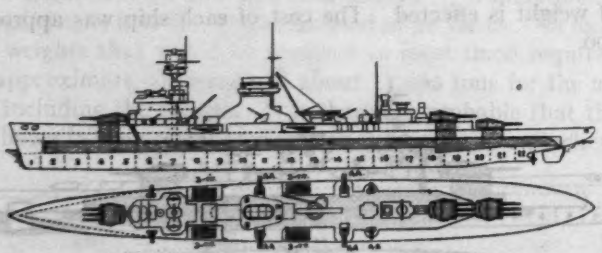
THE ARMOURED SHIP "DEUTSCHLAND"

It is obvious that these ships could be extremely dangerous as commerce destroyers, since their speed enables them to out-distance the majority of existing battleships, while their armour is thicker than that of any ordinary cruiser. The only British ships in commission which could both out-steam and out-fight them at the present time are the

battle cruisers " Hood " and " Repulse." The French battleships " Dunkerque " and " Strasbourg " would also be capable of overhauling and destroying them. At the same time, it is a moot point whether, for example, the First Cruiser Squadron, comprising four ships of the " London " class, could not tackle one of these German ships successfully, since they would oppose thirty-two 8-in. guns to six 11-in., with an advantage of over six knots in speed. It is true that the " Londons " are practically unarmoured ships, but if they could get in enough hits without being knocked out themselves they should be able to cripple their opponent. However, if Germany pursued the same strategy as in the last war, it is questionable whether she would risk her heavy ships in attacks on trade. It is more probable that she would leave this work to her cruisers.

Cruisers

Although two 10,000-ton cruisers armed with 8-in. guns are nearing completion, they are hardly likely to be in commission before December. Otherwise, German cruiser strength is not great. There are five ships of 6,000 tons—the " Nürnberg," " Leipzig," " Karlsruhe," " Köln " and " Königsberg," built between 1926 and 1935, and one of 5,400 tons, the " Emden," of slightly earlier date. The first five are armed with nine 5.9-in. guns, and have a speed of 32 knots, while the last-named has eight 5.9-in. guns and a speed of 29 knots.



The Light Cruiser " Nürnberg "

For their size, these ships are quite formidable craft, every expedient having been adopted to obtain the utmost fighting value from the limited displacement available. The machinery in each of the 6,000-tonners is of the geared turbine type, combined with Diesels for cruising speeds. With the exception of the " York " and " Exeter," no British ship of under 9,000 tons mounts as heavy an armament as the five 6,000-ton German ships.

Torpedo Craft

In torpedo craft Germany can dispose of sixteen recently completed destroyers of 1,625 tons, each armed with five 5-in. guns and eight torpedo tubes. There are under construction ten more destroyers of 1,811 tons, which are believed to mount a somewhat heavier armament, and may be compared with our "Tribals." Some of these are probably approaching the trial stage, as six of them were laid down in 1936. German destroyers are named after naval officers who distinguished themselves during the Great War. The designed speed of all is 36 knots.

Twelve 800-ton vessels of the "Iltis" and "Möwe" classes are officially rated as torpedo boats. Their main armament is three 5-in. guns in the case of three of them; in the others, three 4.1-in. All carry six 21-in. torpedo tubes and have speeds of from 33 to 34 knots. There are also twelve 600-ton torpedo boats, which should now be approaching completion, since they were laid down in 1936. Six more were begun last year. The armament of these includes one 4.1-in. gun and six tubes.

Though half-a-dozen reconstructed torpedo boats, dating from before the War, still exist, they are used mainly for training purposes, and are not of much fighting value, their speeds to-day being under 25 knots.

Under the Peace Treaty, Germany was forbidden to build submarines, a prohibition which was nullified three years ago when the Anglo-German agreement was signed. This gives Germany liberty to build submarines up to 45 per cent. of British tonnage in this category. Forty submarines are now in commission. Ocean-going craft include two of 712 tons, armed with six torpedo tubes and one 4.1-in. gun, and ten of 500 tons, with five torpedo tubes and a 3.5-in. gun. Each also mounts a one-pounder anti-aircraft gun. The respective speeds of these two types are 18 and 16 knots.

The main strength of the flotillas is composed of twenty-eight submarines of 250 tons, with three torpedo tubes and a single one-pounder. Their surface speed is 13 knots. There is no doubt these small submarines were primarily designed for service in the Baltic. The Soviet fleet is known to include a large number of submarines of very similar size and type.

Though all these submarines are normally propelled by Diesel engines on the surface, reports have appeared of a new type of submarine engine capable of functioning both on and below the surface. Actually there is good reason to believe that this engine is still in the experimental stage.

Certainly it has not reached anything like the perfection which has been claimed for it in some quarters.

Subsidiary vessels include two old battleships of 13,040 tons, the "Schlesien" and "Schleswig-Holstein," officially rated as training ships. They were launched in 1906, and mount four 11-in. guns of an antiquated pattern. It is doubtful if they can steam more than 15 knots, so their value is insignificant for other than coast defence purposes. The gunnery training ships "Brummer" and "Bremse" are of 2,410 and 1,250 tons respectively; the former mounts six 3.5-in. A.A. guns, the latter four 5-in. guns, although their armament is varied from time to time in order that different calibres may be tested. Both are believed to be fitted for mine-laying. The "Bremse" is designed for a speed of 27 knots, and it is probable that the "Brummer" is faster than her reputed speed, officially given as 20 knots.

Ten ships of 600 tons, numbered F1 to F10, are officially rated as *Geleitboote*, or escort vessels. They are armed with two 4.1-in. guns and have a speed of 28 knots. There are over 30 minesweepers, twelve of which are 600-ton vessels completed this year, armed with two 4.1-in. guns. The remainder are war-built vessels with a speed of 16 knots, mounting one 4.1-in. gun.

There are twenty motor torpedo boats, some of which are driven by petrol engines and others by high-speed Diesels. Speeds are reported to be from 30 to 36 knots.

The German Admiralty yacht "Grille," like our "Enchantress," is capable of being used for fighting purposes if necessary. She displaces 2,560 tons, and has a speed of 20 knots or more. In peace-time she mounts three 4.1-in. guns.

This practically exhausts the list of fighting units in the German fleet, but there are also half-a-dozen depot ships, a dozen trawlers, thirty motor launches and about twenty tenders attached to the various instructional establishments. Most of these tenders are old minesweepers, rebuilt or otherwise adapted for their present purpose.

Ships Building

Ships under construction, besides those already mentioned, include two battleships of 35,000 tons, with a main armament of eight 15-in. guns. It is probable that a second pair will be begun in the near future. There are also building a third cruiser of 10,000 tons armed with 8-in. guns, two cruisers of 10,000 tons armed with 5.9-in. guns, and three of 7,000 tons armed with 5.9-in. guns. Two aircraft carriers of 19,250 tons

were laid down in 1936, but have not yet been launched. It is expected that each of these ships will be capable of accommodating fifty aircraft, and will possess a speed of over 30 knots. Eight submarines of 740 tons, eleven of 517 tons, and an uncertain number displacing about 250 tons are also understood to be in hand.

Personnel

During the past three years the personnel of the German Navy has been expanded to more than three times the post-War strength of 15,000 officers and men fixed by the Peace Treaty. It is evident, therefore, that a large proportion of the crews must still be only partially trained. Apart from this, most observers are agreed that German naval personnel is very smart and efficient.

TRAINING OF GERMAN NAVAL OFFICERS

By Frank Clements

THE German approach to problems of naval training differs in some ways fundamentally from our own. Both when he is on shore and when he is serving in ships of the Fleet, the German sailor is also what he calls himself—a soldier. Moreover, their navy has a complete land organization, the *Landmarineteile*, which is entirely occupied with coast and air defence and which is run on the same lines as an army. Consequently the spiritual and professional liaison between the German navy and army is much closer than that which exists between the two Services here. In fact it would hardly be an exaggeration to say that the navy is regarded as little more than the " water arm " of the *Reichswehr*. But in these notes it is not proposed to cover aspects of the German training system which are directed to ends or influenced by ideas which have no parallel in British naval practice or theory. It will be seen that there are differences enough between German and British methods of training naval officers when both are attempting to solve precisely the same problems.

There are five Commissioned Officer branches in the German Navy, and the programme allotted to each for training is shown on the accompanying table. Executive, engineering, and medical officers perform the same duties as those of the equivalent branches in the Royal Navy. When afloat, officers of the administrative branch are in a similar position to our Accountant Officers, but ashore their responsibilities are of a wider nature, and their technical training therefore embraces a broader syllabus. The armament officers serve very little time afloat, and that chiefly in higher staff appointments ; ashore they do the work of the civil servants of the Armament Supply Department of the Admiralty. The Germans consider that the rapid technical developments in naval armaments and the resulting influence on tactics make it necessary that these matters should be the care of officers directly responsible to the fleet and in intimate contact with it, rather than of civilians answerable only to a Department and with little or no practical experience of naval conditions.[1]

[1] This is provided for in our Admiralty by the steady flow of officers from sea service through the Naval Staff and Naval Ordnance Department.—Editor.

TRAINING PROGRAMME

	Time	Executive	Engineering	Administrative	Armament	Medical
Candidate	2½ months	← General Military Training →				
	5½ ,,	Sail Training	← Technical Training →			Training Ship
Cadet	6 ,,	← Training Ship →				Studies at Universities followed by naval experience lasting in all about seven years.
	13 ,,					
Midshipman	20 ,,	← Naval School, Flensburk Mürwik →				
	24 ,,	Shore Course	← Technical Training Ashore →			
	26 ,,	← Training with the Fleet →				
	30 ,,				→	

NOTE.—Lieutenants, Armament and Engineering Officers have further technical training.

It will be seen from the above table that candidates for all branches are brought together for training over considerable periods. Great importance is attached to this as a means of ensuring that there is no tendency for the service to split into watertight compartments, and that all officers should accustom themselves from the very beginning to working with one another, thus learning to understand and appreciate the problems peculiar to different branches. This would appear to have many advantages over our system, whereby engineers, after a year in the training cruiser, are banished from their fellows to the Engineering College at Keyham, and whereby doctors do not enter the Navy until they have completed their professional studies, so that they are without Service contacts in their early formative years.

Another point of general interest is that *all* Cadets come from the equivalent of public schools. There is no special establishment such as the Royal Naval College at Dartmouth.[1]

The general military training given to all branches in the first two and a half months has little to recommend it in English eyes. Carried out exclusively on land, it is the same preliminary infantry course undergone by recruits for all arms of the fighting services. The candi-

[1] The respective advantages and disadvantages of Dartmouth and the Public School entry formed the subject of a Lecture and Discussion published in the JOURNAL for November, 1926, p. 738.—EDITOR.

dates are in no way prepared by it for their naval duties, except in so far as they are physically hardened and accustomed to discipline.

For the three months during which the executive candidates go to one of the sailing ships, they form the majority of the crew and carry out themselves all the duties involved. It is worthy of note that, unlike the " sailing " ships of some foreign navies, the German vessels *do* rely on wind for their motive power! The arguments for and against training in sail are too well known to require reiteration, but it is interesting to find that German writers lay stress more on the purely physical benefits derived from this experience—which indubitably strengthens the bodies and courage of those that undergo it—rather than on its value for navigational and general seamanship training.[1] Cadets and Midshipman who at any time fail to attain the standard required revert to general military service, and it must be safe enough to assume that a man who has successfully endured the dangers and hardships of life before the mast is unlikely to fail in any future situation demanding courage, self-reliance or stamina. In fact, it is not until after this trial by ordeal that the rank of Cadet is granted. Until the end of the first five and a half months training, they are all known as " officer candidates."

While their executive comrades are at sea, candidates for the other branches, except the medical which will be dealt with separately, are being given technical training ashore. Those destined for the engineering or armament branches undergo practical workshop experience in the uses and handling of metals, while administrative candidates are attached to a Naval Land Division to learn duties which roughly correspond to those of our Royal Army Service and Pay Corps.

It is not until they all join the training ships—such as the " Schlesien " and " Schleswig-Holstein "—that the real *naval* instruction of the Cadets begins. These ships are run on very much the same lines as H.M.S. " Vindictive " in the Royal Navy. The Cadets work and live as seamen—they are even given lower-deck rates while on board—and are afforded the closest insight into the organization of every department of a warship. Long foreign cruises are made with the double object of showing the German flag and accustoming the Cadets to the conditions of foreign service which is, at present, a rare enough experience in the German navy. On completion of the cruise, that is after thirteen months service, they must pass written and oral examinations in order to be rated Midshipmen, and there follows a fortnight's leave to mark the turning point in their subordinate career.

[1] The merits of and objections to Sail Training for the Navy formed the subject of a Lecture and Discussion published in the JOURNAL for November, 1932.—EDITOR.

When he enters the doors of the Naval School at Flensburk-Mürwik, the young officer begins a new life, the outward signs of which are the officer's dirk at his side and the silver braid on his shoulders. Up to now, his life and training have differed little from those of the lower-deck, but here he begins for the first time the higher studies of his profession and he is granted some of the privileges of rank. Each annual entry of Cadets is called a " crew," and one of the main purposes of the school is to foster the " crew," or as the Royal Navy has it, " term " spirit, so that it remains with individuals throughout their careers. To this end, Midshipmen of the different branches are deliberately mingled in every way possible : for instance, a group of six sharing one of the studies would be made up of two executive, two engineering, an armament and an administrative officer. The School is made into an almost self-contained world with the Midshipmen and staff as the sole inhabitants. Even Christmas, the great family feast, is spent there, and the Christmas celebrations, which the Commander-in-Chief of the Navy usually attends, typify the spirit of professional and social camaraderie with which it is desired to imbue the Service. Also, the school may be described as the shrine of German naval tradition. Trophies and records of the past are everywhere, and the Midshipmen are surrounded by an atmosphere reminiscent of earlier deeds and glories, in order that they may also be inspired to give up everything in devotion to their duty should it ever be required of them.

They are, nevertheless, required to put in much hard work. Beginning at 7.20 a.m., there are five hours theoretical study every forenoon, at naval history, sea tactics, and so on. The great value of a knowledge of foreign languages is fully recognized, and much more instruction is given in them than with us. Lectures on political theory are also given, the purpose of which is, of course, to foster loyalty to the present regime. The afternoons are devoted entirely to sport and boatwork, in which Midshipmen of all branches are equally instructed. Primary importance is given to sailing. There is a great fleet of boats of every type, and everyone is taught not only the elementary principles which are considered ample in the Royal Navy, but also the practice and theory of regatta racing, ocean cruising, and so on. Cadets are expected to take part in the local regattas, and the cruising vessels set out in " squadrons " over the week-ends with a senior officer in command on board the " flagship."

There are ample facilities for all the games played on the Continent, and in these as well as in athletics the officers besides being given the opportunity to attain personal proficiency are taught how to instruct others. It is particularly interesting to note that they all receive riding lessons and are encouraged to hunt with the local packs.

At the end of this school period comes the main part of the examination for Commissioned Rank. On the result of this depends promotion to Sub-lieutenant, and indeed promotion throughout the service career is directly influenced by it. The examination, which is at great length, both on the oral and written sides, is completed after the further technical courses which follow. For the executive officer, there are gunnery, torpedo, boom defence, communication and field training courses, and—for specially chosen officers—another in coast defence. These are short, for they are all completed in four months, but are very intensive, as they are all the "school" instruction given to an officer in the subjects, unless later he specializes. The other branches receive technical instruction, and all undergo the field training course.

The last months of a Midshipman's time are spent in ships of the fleet where they are attached to their own departments for final practical experience as subordinates. If they are found satisfactory by their fellow officers, they are, two and a half years after entry, recommended for promotion, and receive their Commissions.

The training period of executive and administrative officers is now behind them, and they are considered fully qualified to perform normal duties at sea. But the mechanical branches have a further period of study. The engineers, after a year with the fleet, return ashore to learn the higher theory of their profession. Besides naval engineering, subsidiary subjects such as physics, electricity and mechanics are taken. Then there is for them one more examination to be passed before they can at last claim to be fully fledged officers. The armament officers, who have by now been divided into two sub-branches, specializing in gunnery or under-water weapons of all types, must similarly undergo advanced technical training.

It will have been noted that candidates for the medical branch parted from their comrades of the same "crew," or "term" after the preliminary infantry course. After a shortened period in a training ship, where they learn something of naval life and atmosphere both forward and aft, they are sent to Universities to carry out their medical studies. They by no means lose touch with the navy over this long period, for, during the University vacations, they are recalled for practical training afloat or in naval hospitals. After they have qualified professionally, they are attached to a naval hospital for one year, and only after further probationary time with the fleet are they granted Commissions as Assistant Surgeons (Lieutenant's rank.) This usually happens about seven years after their first entry into the Service. The cost of their training at the University is born by the parents.

When the British and German systems are compared, the most

striking difference is probably in the time required by both of them. The German is the more economical of time and money. During a period of rapid fleet expansion this is, of course, a valuable asset to a navy, but there is good reason to suppose that the Germans feel that the period of training has been a little too shortened, and that they will lengthen it as soon as the general naval situation permits. But although the present arrangement is the result of an unusual necessity and tends towards one extreme, it nevertheless does suggest that in the Royal Navy the period of training undergone by executive officers in particular is over long. The British Midshipman spends two years in a gunroom, during which time he receives comparatively little instruction, but is expected to learn much for himself by observation, while he absorbs the atmosphere of ship life and obtains experience in handling men. It is very doubtful whether a two-year period is of any more value for this purpose than would be one but half as long. The officer could go ashore to take his courses with one year's seniority as a Midshipman, instead of waiting for his promotion to Sub-lieutenant. It is indeed rather surprising, to say the least, that it should be necessary to send officers ashore in order that they may learn how to find their way about the sea! There is no "navigation course" in the German Navy. Our other courses go into great detail, much of which is soon forgotten by a Midshipman, and it is during his period with the fleet as a Sub-lieutenant and junior Lieutenant that he learns and retains the knowledge really useful to him. It seems that only the later courses for specialists should be on more than the broadest lines, and that the present junior officers' courses could be considerably shortened.

This is the chief lesson that suggests itself from a study of the German system, and attention has been drawn to some of the matters of detail. such as the greater stress on boatwork and foreign languages, and the more intimate mingling of the training of all branches, in which it could be argued that the German methods possess advantages over ours. It might well repay consideration as to what extent they might be followed in the Royal Navy. The German Navy is generously frank in acknowledging its debt to ours, not only for its methods, but even for its traditions and spirit. Few will deny that it has been an apt pupil, and—as we might say—a credit to us! A wise schoolmaster is never afraid to learn from his advanced students, and might not the time be now here when we can repay the compliment which our old rivals have paid us and see whether there are not some things that they may be able to teach us in return?

FIRE SUPPORT FROM THE AIR

By " HAWAI JEHAZ "

IN an article " Fire Support from the Air," published in the August, 1938, number of the JOURNAL, Colonel Everett, in enumerating the duties of the Royal Air Force component of a Field Army, complains that we have no aircraft specially designed for the attack of troops on the ground, although this is provided for in the air forces of some other nations. He also stresses the weakness of the attack over the defence.

There are two methods of driving home an attack :—

(*a*) By shooting at and killing the defenders.

(*b*) By encasing the attackers in armour so as to enable them to withstand the defender's fire and advance.

The author predicts the failure of artillery observation from the air, because an artillery aircraft must remain in a small part of the sky during a shoot, because it will be vulnerable to attack by fighters while observing, and because it will be a target for anti-aircraft fire. He further discredits artillery fire because it will mean shell-torn ground—a serious obstacle for attacking troops ; whereas the use of small-arms fire against the defenders has no such objection. He dismisses the " armour-plating " method by supplying the defence with anti-tank guns. (Can it really be as easy as that ?) He mentions the use of smoke as an aid to the attack, but says that it can be laid best by aircraft.

The solution offered to many of these problems is " aircraft specially designed for attacking ground targets." Such an aircraft must be fast and very manœuvrable. All its guns must be inclined forwards and downwards so that it can fire whilst flying level. It must be able to carry 100–200-lb. bombs with delay fuses, for use should M.G. fire prove ineffective. Aircraft of this type must be produced in sufficient numbers to enable intense fire to be brought to bear on the defenders' position. It must fly low enough to escape attack from the air and to make the task of the A/A gunner and machine gunner very difficult. Under these circumstances, it is claimed, the trench or the hole in the ground without top cover will become untenable and the problem of the attacker will be simplified, while that of the defender will become more difficult.

The writer also touches briefly upon the potentialities of the low-flying aircraft in defence and quotes Spain as an example of their successful employment against mechanized columns attacking.

THE CASE AGAINST THE "GROUND FIGHTER"

Such is the case in favour of a special type of aircraft for ground fighting. There is no doubt that aircraft have been used with success against ground defences both in Spain and China. Colonel Everett's ideal aircraft, equipped almost exactly as he suggests, appears to have been produced in the form of the Russian R.5. The exploits of this and other types are described in two most interesting articles, "Aircraft and Mechanized Land Warfare" and "The Role of Aircraft in the Spanish Civil War" which appeared in the May and August, 1938, numbers of the JOURNAL. What then are the objections to the provision of such a type for the Royal Air Force?

Surely the answer lies in the answer to another question—why was such a type produced in Spain? It was produced, not because aircraft attack was better than artillery fire, but because of the shortage of artillery; and it remained in existence because of the disparity between the air forces on each side.

The arguments advanced to show that air observation for artillery will be ineffective in a future war cannot be altogether accepted. "Art. Obs." was carried out in the late war with great success despite fixed A/A defences whose gunners were kept in constant practice: and the old R.E.8 was no racer. Enemy fighters were kept at a distance by our own fighters, and there seems no doubt that the same will be the case in the next war. But apart from this, air attacks against ground defences are a poor substitute for artillery fire for the following reasons:—

(1) They are most uneconomical: in order to produce anything like the same material effect as gunfire a great many aircraft are needed, since each can only carry a limited number of bombs. Moreover, the casualties to the aircraft themselves will inevitably be considerable.

Bombs in large numbers will, of course, make as much of a mess of the ground as shells.

(2) Low bombing attacks lack the sustained accuracy of shell fire once the gunners have found the range.

(3) Contrary to what Colonel Everett says, machine-gun fire from the air is practically useless against troops in trenches and rifle pits. The airman can see little of his target and no results from his fire, whilst he himself may be under continual fire from concealed A/A machine guns.

Instances have occurred when trenches have been taken by air action such as the gallant capture of Eagle trench at Passchendaele in November, 1917, by Captain Youdale flying an R.E.8 from 21 Squadron; but these are rare.

(4) Aircraft cannot locate well-hidden ground defences. The airman has as much difficulty in spotting a hidden machine gun which is holding up an attack as the F.O.O. of a battery. He can, however, usually locate a hostile battery in the back areas, which the F.O.O. cannot do.

(5) Modern types of "cleaned up" aircraft do not lend themselves to low-flying machine-gun attack. They lose too much height in recovering from a dive and their very speed makes them far less manœuvrable than the older slower types.

An aircraft with all its guns fixed to fire forwards and downwards must be useless for any other purpose than low-flying attack because it cannot defend itself against attacks by other aircraft.

Aircraft in the Defence

Although Colonel Everett touches only lightly upon this subject, low-flying aircraft are likely to be of far more use in defence than in attack. They were used with great effect to stem the German advance in 1918, and more recently against long mechanized columns during the Nationalist attack on Guadalajarra. They seem specially suited to attacks on such targets, but it must be noted that the Nationalist M.T. was completely without A/A defence.

Conclusion

The R.A.F. component of the Field Force is a weapon which the G.O.C.-in-C. may use in order best to achieve the object at any given time. There cannot, however, be an unlimited supply of aircraft and crews, and the wise commander will be unlikely to use this weapon on tasks which his artillery can perform as well or better, and so, perhaps leave unattacked, targets beyond the range of his guns.

Be that as it may, the lessons of Spain and China seem to indicate that whatever may be our own views, our enemies in a future war appear certain to employ the "Ground Fighter"—until A/A defences make it no longer profitable. It therefore behoves the infantryman to lose no opportunity of practising aiming at aircraft. Let him take heart in the knowledge that few things are so unpleasant for an airman as continuous, well-directed fire from the ground. Although the aircraft may not be brought down, the pilot or observer may have been hit, and the knowledge that a warm reception awaits them each time they cross the lines low down will certainly have a great moral effect upon flying personnel.

Note.—See also "Correspondence."

TANKS IN THE ATTACK

FRENCH AND GERMAN TACTICAL THEORIES

THE divergent tactical theories held by the French and German General Staffs on the subject of the employment of tanks in the attack are analysed by Lieutenant Warringa [1] of the Dutch Infantry, who is an instructor at the Superior War College.

According to the French doctrine, tanks are a supplementary " means of action " placed temporarily at the disposal of the attacking infantry, on whose efforts—in the long run—victory or defeat will depend. The normal mission of tanks is to accompany the infantry, who must follow everywhere the tanks lead. When tank sub-units observe that their infantry are not keeping up to the prearranged programme, they turn back, locate and destroy the centres of resistance that are arresting the infantry advance. In spite of the fact that the tanks have previously overrun a defended area, there will often remain, it is considered, some centres, which have not been located or crushed. Between infantry and tanks, therefore, the tactical liaison cannot be too strict and close.

Tank attacks on distant objectives are not looked upon with favour unless the following conditions can be fulfilled :—

(*a*) A safe and covered starting zone must be assured for the forward movement of the tanks, which must take place at the opportune moment.

(*b*) The objectives must be carefully pre-determined and selected.

(*c*) The success of the struggle with the enemy's anti-tank organizations must be confirmed by close-support tanks or by accompanying infantry.

Insistence on these conditions does not rule out entirely—but certainly renders unlikely—the employment of tanks on distant raids against the enemy's rearward areas and communications.

In the attack, tank and infantry sectors normally coincide. For a decisive blow, tanks are allotted on the scale of one tank regiment per Infantry Division, and are generally sub-allotted to forward bodies on the scale of one tank battalion per Infantry Regiment of three battalions, and one tank company to each infantry battalion. The frontage of a

[1] See the " Militaire Spectator " for December, 1936 and the " Revue d'Infanterie " for April, 1938.

forward infantry company corresponds to that of the section of tanks (five tanks) which is usually allotted to its support.

Methods to be Employed

The methods to be employed vary according to whether the attack is to be launched :—

(*a*) on hastily-prepared positions, unprovided with mine barrages, obstacles, or powerful artillery organization ; or

(*b*) on a strong position, fully organized and equipped with all possible means of defence.

In the case of (*a*), commanders of Infantry Regiments normally retain one tank company in Regimental (Brigade) reserve and battalion commanders, one section. Forward infantry and tanks cross the starting line at approximately the same time and during the first phase, tanks are expected to progress " within the framework of the battalion." Forward sub-units of tanks advance as rapidly as possible towards enemy centres of resistance in the front line, which have previously been minutely pointed out to them. Attacks are often launched at dawn to take advantage of half light or foggy conditions. Infantry, having caught up the tanks, work in close tactical liaison with them, each element protecting the other. Distant centres of resistance, which might impede the progress of the attack are subdued by advanced sections of tanks, which rejoin their infantry on the completion of their task.

In the third phase, reserve tank units, held in readiness to advance after " the break-through," push forward to attack enemy H.Q., gun positions and reserve formations and to repulse enemy tank counter-attacks. As soon as the ground is occupied by infantry, tanks either withdraw and reorganize under cover or take a further part in the pursuit without, however, detaching themselves from the troops, that they are accompanying.

Co-operation with the other Arms

In order to effect surprise, artillery can reduce or even omit preparatory fire. During the first phase, artillery supporting fire is arranged in the same manner, as in an attack without tanks. Later, however, the direct support of infantry is effected chiefly by tanks. At this point, the general tasks of artillery become of greater importance than the direct support of infantry.

Aircraft co-operating with the attack, either report on the positions of enemy A.T. weapons and other important objectives by radio or

deliver direct attacks on these objectives. Aircraft also indicate the various lines reached by the tanks.

The attack on a strongly fortified position demands a powerful artillery preparation, one of whose tasks will be the destruction of A.T. barrages, together with the intervention of medium and heavy tanks. These latter machines will open the way for the combined efforts of infantry and light tanks, and will have to cross the starting line well before the infantry or they will be too late. Their role will be to force breaches through obstacles, to locate and destroy enemy A.T. weapons, and to engage any arms—excluding the artillery—that might effectively hamper the advance of the infantry from the starting line. Medium and heavy machines will operate to a limited depth only, extending normally to the zone of objectives allotted to the forward infantry companies.

To summarize, therefore, the French system of attack is marked by close liaison between infantry and tanks, whose actions, at first, are directed against forward zones of defence. Distant action such as attacks on enemy batteries and O.P.s by light tanks (in the case of a hastily organized position) or by medium and heavy tanks (in the case of strongly organized defences) are envisaged only after the capture of the principal line of resistance.

The German Doctrine

The German doctrine differs from the French in many important particulars. The German General Staff regard tank units—not as " a means of action "—but as the most powerful offensive " arm " that can be employed in land warfare. Tanks, in their view, can be engaged in co-operation with any arm ; by utilizing their full speed, tanks—without being tied to infantry—can render them invaluable assistance at the decisive moment.

In the attack, objectives which are carefully selected beforehand, are generally speaking, the same for tanks as for infantry. Tank units do not support the attack of separate infantry battalions but rather of the Regiment (Brigade) as a whole. The dispositions of the tanks are not settled in consultation with battalion commanders, but by Regimental or even Divisional Commanders.

The tanks cross the infantry starting line and advance in a series of waves corresponding to the various echelons in the enemy defences. Their task is to break down the principal line of resistance, and then, passing through the rear lines of defence, to penetrate to the artillery position and silence the guns. The advance of the infantry is thus indirectly supported by a series of tank attacks in depth. The German

Regulations do not draw any distinction, as regards the tactical action of tanks, between an attack on a hastily prepared position or on a strongly organized system of defences. The nature of the resistance influences only the type of tank to be employed—whether light, medium or heavy—and not the general tactical methods.

The mission of the first wave of tanks is to penetrate the enemy's position at high speed—without paying particular attention to the enemy's A.T. weapons, which it is hoped to blind by smoke curtains—and to engage the enemy's artillery and reserve formations while keeping a look out for possible tank counter-attacks. The second wave advances rapidly in rear of the first and is directed against an intermediate objective. Its role is to crush all enemy organizations, located between the starting line and this objective—usually a distance of 4;000 to 5,000 yards—which might exercise a direct influence on the course of the attack. The third wave advances against centres of resistance in the enemy front line and acts in close collaboration with infantry. The infantry only cross the starting line when the first wave of tanks are due to have reached the zone of the enemy's artillery in accordance with the time programme.

As regards artillery, little emphasis is placed on the necessity for the supporting fire of artillery once the tanks have been launched. The role of artillery is—broadly speaking—to effect a short but intense preparation ; to lay down smoke curtains ; to destroy enemy A.T. mine barrages ; to deliver harassing fire on fronts where the attack is not being pushed home ; and to bring down protective barrages on the flanks of the area selected for the decisive blow.

To summarize : the German doctrine is that tanks should neutralize the whole depth of the enemy's defences—including the artillery positions—before the infantry cross the starting line. Attacks on hastily organized defences are to be delivered by light tanks supported by a proportion of medium machines. Attacks on fully organized systems of defence are to be effected mainly by medium and heavy tanks. The tactical methods in both cases vary but little.

Varying Views

There is, as the reader will observe, a profound disagreement between the two tactical doctrines. According to the French General Staff, the success of the attack will depend upon the preliminary capture of the enemy's infantry position by the combined action of infantry and tanks. Then—and then only—can distant action be undertaken against the enemy's artillery positions and rear organizations. The German view,

however, is that the attack on the whole defensive system—including the artillery positions should be undertaken simultaneously at, or even before Zero—the starting time of the infantry.

Both these tactical theories have been subjected to intense criticism. General von Eimannsberger—the author of an important study of tank warfare, declares that—as regards the French doctrine—to tie tanks to infantry so that the tanks cannot utilize their chief asset—speed—constitutes a "tactical monstrosity." Armoured divisions, in his view, should be handled like Napoleon's cavalry divisions, at full speed, and should be closely supported by the combined efforts of the other arms. The motor, he affirms, is the hope of the future; one must profit from its characteristics and not tie it to slow moving infantry. Nor are French experts unanimously in favour of too narrow a collaboration between infantry and tanks. Tanks, it is alleged, can work for the direct and immediate help of infantry without actually accompanying the latter.

On the other hand, Colonel Perré—an expert on tank warfare and the author of a well-known book on the subject—writes very scathingly in his review of the German tactical doctrine. He declares that not only can tanks not occupy ground, but they cannot even capture it without the assistance of the other arms. The visibility from a closed-in tank is, he argues, so low that the machines are unlikely to locate the bulk of the enemy's A.T. and automatic weapons, more particularly when the absence of attacking infantry does not oblige these weapons to open fire. He rejects the theory of the attack at full speed because, in his view, experience has shown that tanks can rarely exceed a speed of about eight miles per hour on undulating ground without losing direction and because at any moment, tank obstacles may unexpectedly present themselves.

Lieutenant Warringa, who is in general agreement with Colonel Perré, considers that the German system may be extremely hazardous for the tanks. Success on these lines, he opines, would only be possible against an enemy occupying a hastily organized position or ill-equipped with A.T. weapons. Smoke screens, he considers may, in certain conditions, be more dangerous to the attackers than to the defenders, and may cause the tanks—already hampered by low visibility through armoured slits—completely to lose their way.

The German General Ludwig is also sceptical as to the real value of tanks in battle, and rejects the theory that tanks alone will be able to undertake the principal missions formerly entrusted to artillery and infantry. "Infantry," he declares, will continue to carry the chief burden of war."

THE DEVELOPMENT OF THE FLOAT SEAPLANE

By H. J. C. HARPER, A.M.Inst.C.E., A.F.R.Ae.S.

PART II.—THE POST-WAR PERIOD[1]

VERY great changes have taken place in the design of float seaplanes since the War. The whole flotation system has changed and also the shape and construction of the floats themselves. The flotation system most favoured in this country during the War period and immediately afterwards was the short float system which consisted of two short main floats, a tail float, and a float on each lower wing tip. The main floats supported most of the weight and the tail float gave longitudinal stability when the seaplane was at rest or taxi-ing at slow speed. Wing tip floats were fitted to ensure lateral stability under adverse conditions. The main floats each had a single step formed by the after end of the float being cut off square. The step being well forward of the centre of gravity of the aircraft the seaplane was not stable on the water fore and aft when hydroplaning, and therefore all control had to come from the air control surfaces. This gave the pilot a large range of control which could be utilized to assist the machine in riding over rough seas.

In later types of floats, such as those fitted to the Fairey III C, the after part was extended for a short distance to form a buoyancy chamber at the rear of the step. This reduced the load on the tail float when at rest and when taxi-ing, and therefore diminished the stresses in the fuselage. It did not, however, improve the stability at planing speed and reduced to some extent the range of control.

The resistance with the short float system was high, due to the large angle of trim up to hydroplaning speed and also to the large volume of spray from the main floats being thrown against the tail float. The large trimming angle at low taxi-ing speed had the advantage of the maximum water clearance for the airscrew being obtained.

In rough seas considerable loads were liable to be imposed on the wings due to the wing-tip floats striking waves. Under similar conditions heavy loads were imposed on the tail float which applied severe

[1] Part I of this article dealing with " The Pre-War and War Periods " appeared in the JOURNAL of August, 1938, p. 552.

stresses to the fuselage. The necessary strengthening of the structure resulted in a good deal of extra weight, and this together with the additional air resistance of the wing-tip and tail floats, had a detrimental effect on the performance of the seaplane. Floats fitted with two steps were also tried. This type of float endeavoured to adhere rigidly to a certain angle of trim (i.e., attitude) on the water, consequently, even at considerable speed there was not sufficient control from the air surfaces to regulate this angle through a large range. Therefore, there was a tendency for the floats to plunge into advancing waves.

A number of seaplanes were produced in the years immediately following the cessation of hostilities which broke away from the short float system. Some of these were of original design, and some were conversions of existing landplanes. Of the former class were the Avro Schneider (240 h.p. Puma engine) and the Sopwith Schneider (450 h.p. Cosmos engine) which were designed for the 1919 Schneider Trophy Contest. The floats were single-stepped, but their buoyancy and the position in which they were fitted to the fuselage was such that no tail float was required. Wing tip floats were also dispensed with. The Avro " Antarctic Baby " had similar floats. The Bristol Tourer seaplane (240 h.p. Puma engine) had rather longer floats with flat tops, as also was the case with the Avro " Viper " and Avro " Lynx " seaplanes. A Martinsyde F4 seaplane (300 h.p. Hispano Suiza engine) was also produced with long floats having two steps and a buoyancy chamber aft of the rear step.

Developments have proceeded with the long float system, the second step being suppressed. In this system the two main floats support the whole of the weight of the seaplane and provide both longitudinal and lateral stability. The step is approximately beneath the centre of gravity of the machine and the bottom of the float aft of the step is swept upwards to the stern post. With such floats it is possible to control the attitude of running on the water sufficient to prevent the nose burrowing into a head sea. The long float system has a much lower resistance when taxi-ing than the short float system. Another advantage is that the seaplane is not subjected to such severe stresses either when taxi-ing or when adrift on the water. The absence of wing tip and tail floats in seaplanes with long type floats has resulted in the structure of the machine not being very much heavier than that of the landplane. As a consequence it has been possible to design aeroplanes for naval purposes with alternative land or sea undercarriages without unduly handicapping the landplane version. The fitting of floats to many existing landplanes has also been possible without much alteration.

A third system of flotation is the central float. Seaplanes in which

this system is adopted have the float located immediately beneath the fuselage and as close as the requisite airscrew clearance will permit. This float takes the whole of the weight and is of adequate length for longitudinal stability without a tail float. Lateral stability is provided by wing tip floats. The central float seaplane has been adopted to a great extent in the United States but has not found much favour in this country. No British seaplanes of this type have gone into production and only a small number have been tried out experimentally.

Development in Float Design

Much progress in seaplane design has been achieved through tests carried out with models. The model of the float or of the whole seaplane is towed over the surface of the water contained in a long tank in a similar manner to that adopted by naval architects when investigating the design of the hulls of ships. From a modest beginning, when the measurement or comparison of the resistance was all that was required, the science has been developed until it is now possible to predict with some degree of certainty all the qualities of importance to the satisfactory functioning of the seaplane.

Many changes have taken place with regard to the shape of the floats. The short type of floats were mostly of rectangular section. These hydroplaned well, but were prone to damage in a rough sea. The modern long type of float has a hollow or concave Vee bottom. This shape keeps down the water thrown out in the form of blisters or spray. It also has a cushioning effect which relieves the impact loads during take-off and alighting. In side elevation the modern float has a straight deck line and a blunt rounded nose sweeping in a gradually flattening curve to the step. Aft of the step the bottom is inclined upwards to the sternpost.

Considerable advances have also been made in the construction of floats. The early ones were mostly of three-ply box construction, and although easy to build were heavy and weak. This type was superseded by floats of boat-built construction, which were both lighter and more robust. Wooden floats all suffer from the serious disadvantage that they soak up water with consequent increase in weight. In hot climates the timbers may shrink and give rise to serious leakage. Floats of metal construction were successfully developed for racing seaplanes, and as a result the wooden boat-built floats rapidly became obsolete.

Influence of Racing on Seaplane Design

The contests for the Schneider Trophy have resulted in considerable progress in seaplane design. The Trophy was presented to the *Fédera-*

tion Aéronautique Internationale by M. Jacques Schneider in 1913, for a competition between seaplanes of all nations. The details of the competition have been varied from time to time by the Committee of the F.A.I., but two features have always remained, one being that the competing machines should carry out a preliminary seaworthiness test, and the other being that the flying itself should be done over open sea-water. The original intention of M. Jacques Schneider was to encourage the production of genuine sea-going aircraft, but in the opinion of many the competition gradually developed into a pure speed contest in which seaworthiness was of very secondary importance. It was pointed out that arrangements were always made to hold the competition in a spot which was as sheltered as possible and consequently likely to assure comparatively peaceful conditions. It is considered, however, that the seaworthiness trials did ensure that the seaplanes entered for the contest were not mere racing freaks, but reasonably seaworthy craft capable of operating in normal weather conditions. The preliminary tests usually consisted of several take-offs and landings also spells of taxi-ing after which the seaplane had to remain moored to a buoy for several hours. If the flotation system was inadequate to stand up to the conditions, the aircraft would sink at its moorings, if not before.

Considerable research was required to produce floats which not only had the necessary water qualities but which offered the least possible resistance to the air. In the case of the last, few contest designers had to consider the hydrodynamic characteristics of the seaplane at take-off and alighting speeds of round about one hundred miles an hour. The aerodynamic research necessary to enable the required high speeds to be achieved, benefited the land plane as well as the seaplane.

It will be of interest to trace the increase in speed during the various contests for the Schneider Trophy.

The first contest, held in 1913, was won by Prévost on a Deperdussin seaplane at a speed of 45.7 m.p.h. In the following year Pixton, on a Sopwith seaplane, won the contest for Great Britain at a speed of 86.8 m.p.h.

The War prevented the holding of further contests until 1919 when the third was held at Bournemouth. This was declared void, as owing to fog, none of the competitors satisfactorily completed the course. In 1920 and 1921 there were only Italian competitors in small flying-boats. In 1922 Biard won the contest with a Supermarine Sea Lion flying-boat at a speed of 147.5 m.p.h.

The contest in 1923 was held at Cowes, and it may be said that this inaugurated a new era in the Schneider Trophy. A highly organized and well-equipped team entered from America, and proved that the

development of high-speed aircraft in that country had gone ahead of similar development in Europe. Lieutenant Rittenhouse in a Curtiss C.R.3 seaplane was the winner at a speed of 177.4 m.p.h. The eighth contest, 1925, was won for the United States by Lieutenant Doolittle in a Curtiss R.3.C.2 (465 h.p. Curtiss D.12 engine) at a speed of 232.57 m.p.h. Broad in a Gloster III being next at 199.2 m.p.h. The Supermarine S.4, which had put up a short-lived speed record of 226.3 m.p.h. was crashed during the preliminary trials. In 1926 there were no British entrants, and the winner was Major Bernardi, Italy, on a Macchi M.39 monoplane (800 h.p. Fiat AS.II engine) at 246.5 m.p.h.

In 1927, for the first time in the history of British aviation, the British participation was a Service one. Six racing seaplanes were built to Air Ministry order and sent to Italy for the contest. They were three Supermarine-Napier S.5 monoplanes, two Gloster-Napier IV biplanes (all fitted with special Napier Lion racing engines) and one Short-Bristol Crusader monoplane, fitted with a Bristol Mercury engine. Flight-Lieutenants Webster and Worsley in Supermarine-Napier S.5's were first and second with 281.54 and 272.96 m.p.h. respectively for the full course of 218 miles.

In 1929 a British Service team was again entered. The winner was Flying Officer Waghorn in a Supermarine S.6 (Rolls-Royce " R " engine) with 328.63 m.p.h. Flying Officer Atcherly in another Supermarine S.6 covered the course at a speed of 325 m.p.h., but was disqualified for not rounding one of the turning-points properly.

On September 12th, 1931, Flight-Lieutenant Boothman in a Supermarine S.6.B won the trophy outright for Great Britain (this being the third successive win) by covering the distance of 217.5 miles round a triangular course at an average speed of 340 m.p.h. It is a striking fact that the increase in speed between the first and the last contests was nearly three hundred miles an hour. The Supermarine S.6.B was capable of a higher speed, as was proved on the 29th September, 1931, when Flight-Lieutenant Stainforth put up a world's speed record of 408.8 m.p.h.

Service Types

The development of Service types of float seaplanes was somewhat slow for the first few years after the War. The Fairey III C, which was produced in 1918, continued to be used. The Fairey III D was the first new type to be produced. It was very similar to the III C, but was a three-seater. It was essentially a Spotter-Reconnaissance, but could also be used as a bomber. In its original form in 1921, it was fitted with a Rolls-Royce Eagle VIII engine, but in 1923 this was changed to a

450 h.p. Napier " Lion." It was the first British seaplane to be regularly used for catapulting. Four machines of this type were specially modified and embarked in H.M.S. " Vindictive " at the end of 1925 for a two year commission on the China Station. During that time they were regularly launched by means of the catapult. The Fairey III D proved very serviceable and did not pass entirely out of use until 1931. It was the last Service type of seaplane to be fitted with short main floats and wing-tip and tail floats.

In 1923 the Fairey " Flycatcher " was produced. This was a single-seater, and could be fitted either with a wheel or float undercarriage. Wheels were incorporated in the floats so that the machine might operate from the deck of an aircraft carrier, from an aerodrome, or from the water. At a later date these wheels were removed from the floats, as it was found that the drag of the wheels made take-off from the water difficult in a flat calm under tropical conditions. The floats were boat built with two skins of mahogany laid on elm timbers. A small number of pairs of duralumin floats were made and were fitted to the seaplanes embarked in H.M.Ss " Enterprise " and " Emerald." A certain number of " Flycatchers " were modified for catapulting and also embarked in cruisers. These machines were of very sturdy construction, and the last one was not withdrawn from service until 1934. The Parnall " Plover " was built to the same specification, but only three experimental machines were built, the type not going into production.

The Fairey III F was produced in 1926 to replace the Fairey III D. It was also a Spotter-Reconnaissance and had alternative wheel and float undercarriages. The early production aircraft were of wooden construction with the exception of the front portion of the fuselage and the floats. The entire structure was afterwards metalized and a Napier " Lion XI " instead of a " Lion V.A " was installed. These machines were designed for launching by catapult, and a number were embarked in capital ships and cruisers. The Fairey " Seal " of 1932 was essentially a Fairey III F modified to take a 525 Panther II A engine. Like the Fairey III F, it is no longer in service.

Another aircraft which has been much used as a seaplane and embarked in cruisers, is the Hawker " Osprey." Fitted with a Rolls-Royce " Kestrel " engine, it has a speed of about 170 m.p.h., and has been found capable of operating in comparatively rough seas. It is being replaced in a number of cruisers by the Fairey " Seafox." This aeroplane is one of the few which has been specially designed as a seaplane. Its ability to operate in heavy seas rather than a high speed, is its particular feature.

The Blackburn " Ripon," torpedo carrier, was also provided with a

float undercarriage, but was never extensively used as a seaplane. The Fairey " Swordfish " and the Blackburn " Shark " are also used as seaplanes, but they operate chiefly from aircraft carriers as ship-planes, i.e., with wheel undercarriages.

The Vickers " Vildebeeste " torpedo bomber and the Fairey " Gordon " are other service types which have been fitted with floats for special duties. The latter and the Fairey III F have proved particularly useful in policing the valley of the Nile, especially during the flood periods.

The Parnall " Peto," a small two-seater seaplane, specially designed for stowage in a confined space, was used for experiments in the Submarine " M2." The " Peto " was accommodated in a watertight hangar in front of the conning tower. When required for flight it was launched by a catapult.

The Avro " Seatutor " was basically a " Tutor " aeroplane adapted for seaplane work and specially protected against corrosion. One was embarked in H.M.S. " Frobisher " when she was used as a training ship for Cadets.

Float undercarriages have also been fitted to a small number of " Tiger Moths " for training purposes.

Civil Types

Although there have been few civil seaplanes initially designed as such, a number of landplanes have been adapted for seaplane work, and floats fitted. This has been the case with several different types of De Havilland aeroplanes. Early examples of such conversions were the D.H.50.A (240 h.p. Puma engine) and the D.H.50.J (385 h.p. Jaguar engine). It was in a seaplane of the latter type that Alan Cobham flew to Australia and back in 1926. As the flight was made during the monsoon season, the float undercarriage enabled the seaplane to alight on rivers and other waterways when landing with wheels, on many of the landing grounds, would have been impossible.

The De Havilland Company of Canada have carried out the conversion of a number of twin-engined " Dragon " and " Dragon Rapide " aeroplanes for use in that country. All the necessary changes and design work have been done by this company and the floats are of Canadian design and construction. The maximum speed of the " Dragon Rapide " as a landplane is 160 m.p.h., and as a seaplane 145 m.p.h. at the same all-up weight; two 200 h.p. Gipsy Six engines being fitted. These seaplanes have been used for survey work and also for the conveyance of passengers or freight to outlying districts. Seaplanes have

been found particularly useful in the wooded parts of Canada where there are no suitable landing grounds and aircraft can operate only from rivers and lakes.

Light aeroplanes such as the De Havilland " Moth," the Blackburn " Bluebird " and the Avro " Avian " have also been fitted with floats. Such small seaplanes are only intended to operate in sheltered waterways. A notable flight with a Moth seaplane was made by Mr. F. C. Chichester who, in 1931, flew across the Tasman Sea from New Zealand, by way of Norfolk and Lord Howe Islands, to Sydney. Some time afterwards he continued along the Australian coast via New Guinea and the Philippine Islands, and thence along the China coast on to Japan. During these flights he experienced many difficulties, but demonstrated what could be accomplished with a small seaplane.

That old established aircraft company, Short Brothers, of Rochester, have produced a number of civil seaplanes of interesting design. The latest is the " Mercury," which is the upper component of the Short-Mayo Composite aircraft, the lower component being a flying-boat. This seaplane is a high wing monoplane with four Napier " Rapier " engines giving a total horse-power of 1,360. The maximum weight is 20,500 lbs. The range in still air is 3,800 miles at a cruising speed of 180 m.p.h. and with a pay load of 1,000 lbs. On 20th July last, " Mercury " was launched on its first transatlantic flight off Foynes, Eire, and reached New York 25 hours 9 minutes later after a stop of two hours at Montreal. The time of the Atlantic crossing to Newfoundland was 13 hours 29 minutes.

It appears to be very doubtful, however, whether large float-planes will be used for conveying passengers for long distances over the open sea. For this purpose the large flying-boat is generally favoured, for at the present stage of development this latter type of aircraft is more seaworthy.

THE MILITARY ENGINEER IN MODERN WARFARE

By MAJOR-GENERAL L. V. BOND, C.B.

On Wednesday, 9th March, 1938, at 3 p.m.

LIEUTENANT-GENERAL SIR J. R. E. CHARLES, K.C.B., C.M.G., D.S.O., in the Chair.

THE CHAIRMAN: I have much pleasure in introducing our Lecturer this afternoon—General Bond. He is probably well known to all of you as Commandant of the School of Military Engineering at Chatham.

MY excuse for taking up your time, with what may seem a technical or a specialist subject, is that developments in the organization of armies and in methods of warfare since 1918 have, it seems to me, very materially affected the place of the military engineer in modern armies. I doubt whether the effect of, for example, the mechanization of armies on the strategical and tactical value of the engineer arm is being fully realized, even in my own Corps. I propose, therefore, to examine these developments and to consider the calls which should be made on us and the extent to which improvements in equipment and methods have allowed us to keep pace with these calls. I shall, of course, speak from the point of view of the British Army and of British problems. And I hope that I shall not be accused of speaking too much from the point of view of the Royal Engineers, or of overrating the importance of my own Corps.

In order not to make too large a call on your patience, I shall have to confine my remarks to mobile warfare and mainly to the role of Divisional, Corps and Army Engineers—that is to say, to engineer units particularly affected by the problems of mobile warfare.

As we are taking 1918 as our starting-point, I should like to begin by a reference to what I believe to be a misconception regarding the engineer establishments at the close of the War. You will remember that we had, not only in France, but on all fronts, an establishment in the division of three field companies R.E. and a pioneer battalion. In addition, under corps and army control, there was a large variety of engineer and labour units—Army Troops Companies, Tunnelling Companies, Road Construction Units, and so on. It is generally thought that these establishments, being the result of static warfare, were excessive

for the requirements of mobile warfare. That view is comforting to the economist, but I believe it to be totally untrue. In Mesopotamia, as C.R.E. of a division during the final operations, I should have been glad of double these establishments. They were not found too great, I feel sure, in Palestine and Salonica. In France during the period of mobile warfare before the Armistice the whole of the engineer resources were hardly sufficient to keep the army in motion.

As an example: in one Corps on a two-divisional front none of the twelve field companies and four pioneer battalions of the Corps together with army troops and tunnelling companies had a day's rest; while working parties of a brigade of infantry were required on a single road. In another division, advancing slowly on a single brigade frontage, the three field companies and one pioneer battalion and a most efficient Australian heavy battery were fully employed. Had speed been necessary, the C.R.E. tells me that double these numbers would have been required. On this divisional line of advance every bridge and culvert was systematically destroyed, and in ten days fifty to sixty had to be repaired.

As a further example of the difficulties of moving as opposed to static warfare, I may mention that during this period of moving warfare in October and November, 1918, over 300 heavy bridges were erected on the front of the B.E.F. in France, including as many stock spans as were erected during the whole four years up to August, 1918, and this in addition to the pontoon and other temporary bridges required for the initial crossings of the comparatively minor obstacles on our line of advance. On the 11th November, the Army was indeed about to be brought to a standstill by the delay in the repair of roads and railways. The experience of 1918 showed, in fact, that it is mobile warfare and not static warfare which imposes the maximum strain on the engineers of forward formations: that, contrary to the usual belief, establishments sufficient for static warfare will normally prove insufficient for mobile warfare.

You may object that these conclusions are based on a period of the War in France where our opponent had time to prepare demolitions on an extensive scale, and that, although continuously battered, he was not hustled. What I shall try to show is that recent developments in equipment and technique have made it possible to create similar obstacles at very short notice, and in consequence to impose similar delays.

REDUCTION OF MANPOWER

I would first ask you to note that although our own engineer establishments have, since 1918, by reason of mechanization and improved

equipment considerably increased their efficiency in certain directions, our present establishments are in actual manpower considerably less than at the period of 1918 to which my examples refer. The working manpower of divisions as a whole has also been considerably reduced, while the number of vehicles in formations and their average weight tend vastly to increase. The general effect of these changes, as we shall see, is greatly to increase the efficiency of our engineers in destruction without a corresponding increase in their powers of reconstruction.

On the other hand, engineer establishments in foreign armies are, in general, considerably greater than our own. In those armies which we have mainly to consider, divisional, corps and army engineers, like our own, are or will shortly be fully mechanized with personnel carried in lorries. Their equipment is in no way inferior to ours, and their opportunities of training are generally much superior to those which we in this country enjoy. We must not flatter ourselves, therefore, that the technique of our opponents will not be up to the highest modern standards. We know, in fact, that it is so, for in such armies the art of the field engineer is being intensively studied and widely applied.

In all armies the rapid execution of demolition schemes is receiving particular attention. As two examples of improvements in demolition technique, I may mention that a road crater which in 1918 might have taken 12 to 24 men 48 hours to prepare, could probably now be executed in one to two hours by six men. Again, with the pneumatic tools included in the equipment of all field units, more effective demolitions of bridge abutments and piers can be executed with far greater speed than by the old hand methods.[1]

Apart from these alterations in engineer organization and technique which, as I have said, favour the destructive engineer, rather than the constructive engineer, what general changes in organization and methods of fighting have taken place since 1918, and what is their effect?

[1] It may be objected that the widespread use of reinforced concrete for bridges may reduce the efficiency of the demolition technique of the military engineer. There are two answers to this objection, viz. :—

(*a*) The majority of reinforced concrete bridges on the Continent appear to be fitted with demolition chambers or boxes; and it may reasonably be assumed that these are so located (in accordance with the disposition of the steel reinforcement) as to ensure demolition.

(*b*) The new equipment of field units very much increases our efficiency in the destruction of such bridges.

The difficulty in the destruction of reinforced concrete usually arises from the necessity of carrying out the demolition by successive stages, cutting separately the concrete casing and the steel reinforcement. Such bridges are therefore unsuitable for "final," i.e. last-minute demolition, and where they occur on essential last-minute routes it may prove necessary to build a temporary bridge to take the traffic while the permanent bridge is destroyed.

MECHANIZATION

The first factor to be considered is *mechanization :* first in the sense of the substitution of mechanical for horse transport and of the provision of troop-carrying vehicles ; second, in the sense of the increase in the employment of mobile and armoured forces ; and third, in that of the lorry carriage of the engineer personnel of divisional, corps and army engineers. The effect of the partial mechanization of the infantry is to increase to some extent the general mobility of the army and to allow of great mobility for small mixed detachments of all arms. The increase in the mobile and armoured forces in the hands of the enemy results in a constant menace of surprise attack against the front or flanks of troops in motion.

The complete mechanization of the engineers not only saves them from fatigue and makes them therefore more efficient for work, but it allows the engineers to waste no time in movement and permits them to undertake tasks at distant points and on very wide fronts which before would have been impossible.

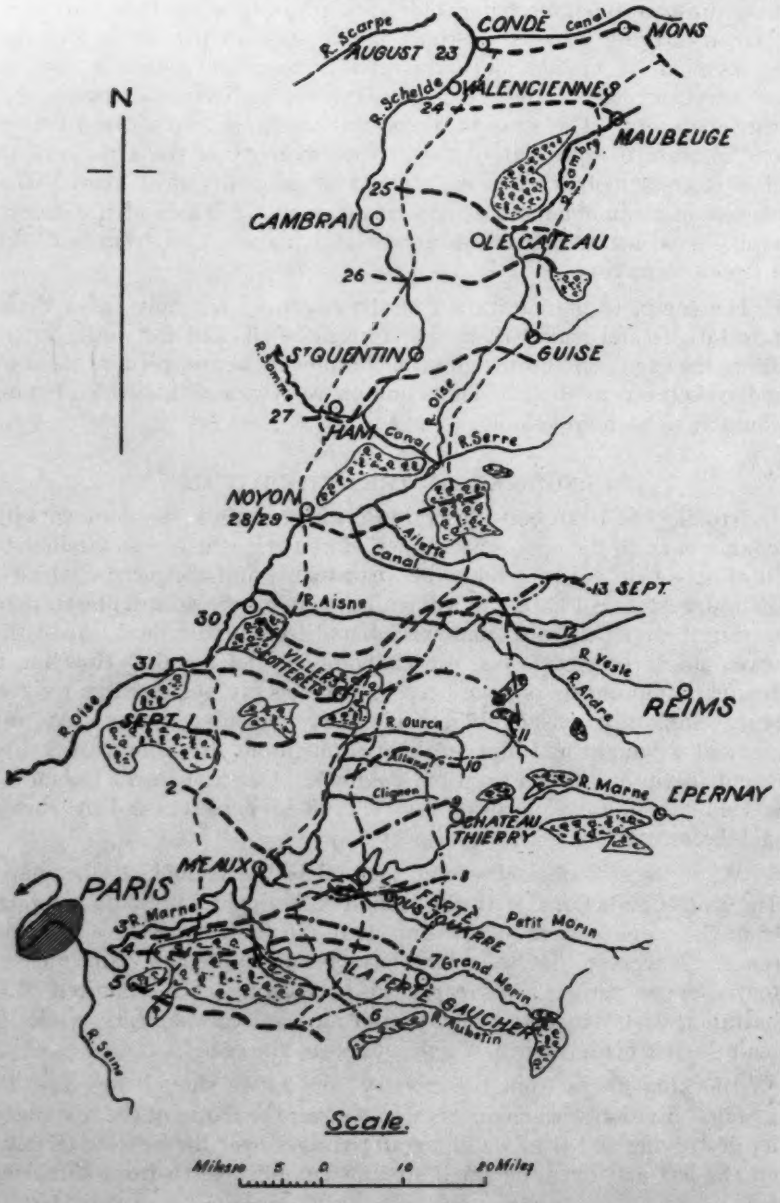
ENGINEERS IN THE WITHDRAWAL

I think that I can best illustrate the effect of these developments by looking back to the open warfare period of 1914, which is so familiar to all of us. I do not pretend to be a strategist, and the picture which I shall suggest is, as I hope you will realize, only for the sake of illustration. During the retreat from Mons we suffered from a continual fear of the envelopment of our flanks, especially of our left flank. How much greater would our fears have been had the enemy possessed and vigorously employed considerable mobile and armoured forces. At any moment we might find him breaking through our marching rearguards, or cutting in on the flanks of our columns. Our first instinct would, I feel sure, be to put a physical obstacle between ourselves and the enemy mobile forces.

What lines of obstacles offer themselves as we look at the map ? The Mons-Condé Canal with the ground on both sides presents (to judge from the map) an area almost impassable to tank forces except by the roads. I suggest that we might have been tempted to hang on here for a longer period with rearguards, consisting of mechanized M.G. battalions, lorry-carried infantry, and mechanized engineers, while the main bodies made their first long bound to the rear.

Blocking forces from the cavalry—or, as we should now say, the mobile—division with engineers would cover the flanks of the rearguards by destroying and then watching all passages over the Schelde (Escaut) on the left and over the small streams running North from Maubeuge

MONS TO THE AISNE
1914



towards Mons on the right. The main bodies, passing West of the Foret de Mormal, would, I think, endeavour to keep within the corridor formed by the Sambre and Oise on the East and the Schelde and St. Quentin Canal on the West; blocking these waterlines on their flanks by mobile detachments formed mainly from M.G. battalions and engineers and supported by tank units for counter-attack. Such " blocking " is a new employment for the engineers and one which their new mobility alone allows them to carry out. It requires dispersion in small parties and calls for a very high degree of training among the junior N.C.Os.

No obstacles of any value for covering the rear of the army run East and West between these two flanking obstacles, and we should have endeavoured as soon as possible to get behind the line of the Somme-Crozat Canal and later behind the major obstacle of the Oise and Aisne.

We have here two characteristics of modern warfare: the use of physical obstacles and of " blocking " detachments to cover open flanks to considerable depths, and a progression by bounds from physical obstacle to physical obstacle to which one side or the other will look for protection. To make good these river lines we should have sent back, in one bound, from the Mons–Le Cateau area, corps and army engineer units to prepare and execute extensive demolition belts based on these water lines, leaving only a minimum of passages for last minute (or " final ") demolitions.

These engineer units would be completely mobile, since there is to-day no essential difference between the functions of the corps or army engineers and those of the divisional engineer units. Their organization and equipment will be identical, and to secure the full effect of their mobility their allotment must be completely fluid. Such units could have reached the river lines which I have mentioned, and successive river lines in further retirement one, two or even three days ahead of the army. Meanwhile the divisions in their retirement would also have sent a portion of their fully mechanized divisional engineers back by shorter bounds to prepare such tactical demolitions as the ground permits; the cratering of roads in defiles, the destruction of railways, the laying of delay action mines, the preparation of extensive tree blocks where the roads pass through forests.

When we remember that in 1914 a pause of twenty-four hours allowed our " foot-slogging " engineers with their primitive equipment to destroy the whole of the bridges over the Marne from Meaux inclusive to La Ferté, we may imagine the extent of the obstacle belts which the modern engineer with his mobility and specialized equipment ought to be able to create. We could seldom undertake such tasks in 1914, because our engineers not only marched at the same pace as the army,

and at the same pace as the enemy, but also because they were equally exhausted by this marching. Moreover, we had no corps or army engineer units to undertake work well to the rear of forward formations. We certainly succeeded in demolishing a number of bridges, but, if we ever thought of cratering, the thought was dismissed because a crater involved a forty-eight hours job of mining. The military engineer is now in fact capable, if properly used, of very rapidly creating over wide fronts in a very short time the conditions which the whole of our engineer resources in France in the autumn of 1918 could only painfully and slowly overcome.

But the engineers will only be able to do this subject to four conditions :—

(*a*) That the command appreciates the value of such obstacles and takes definite decisions in good time.

(*b*) That the staff understand the technical requirements of the engineers.

(*c*) That information has been accumulated in peace or that reconnaissances have been initiated in good time.

(*d*) That the engineers are sufficient in numbers and in mobility.

In 1914 none of these conditions obtained on either side. I might add a fifth condition :—

(*e*) That the divisional, corps and army engineers down to the lance-corporal, are fully trained and practised in peace : a condition which requires peace establishments adequate both for peace training and to meet mobilization requirements and peace strengths adequate to fill peace establishments.

ENGINEERS IN THE ADVANCE

We have considered the British Army in retreat. Let us reverse the picture, as on 5th September, 1914, remembering that it is now the enemy whose engineers are endowed with modern mobility and demolition equipment. You will remember that the B.E.F., with little in front of it, pushed forward over the Morin and Marne and almost without interruption up to, and over, the Aisne. Armies imbued with the offensive spirit are peculiarly apt to ignore the value of demolitions, and the German cavalry divisions in 1914 were almost incredibly feeble in this respect. With the exception of the completion of our own partial demolition of the eastern bridge at La Ferté, no bridges over the Marne were destroyed on the front of the B.E.F. Kluck's First Army tried, you will remember, to repair this failure by sending down Kraewal's detachment but forgot to issue the orders to the engineers which were to form part of it. It is impossible to imagine such failure to-day. All

first-class armies recognize fully the importance of waterlines, and they all are studying and practising intensively the thorough and rapid execution of belts of demolitions and blocks. None will make the mistake of leaving bridges undestroyed in the hope of a subsequent advance. Nor will anyone risk failure of essential demolitions for fear of cutting off a few stragglers. In the case which we are considering a prudent commander of the German First Army, or a foreseeing Chief Engineer, would have collected information about all bridges in the army area and would have taken preliminary steps to prepare the bridges over the Marne for demolition.

Let us visualize the British advance in these circumstances. On the 6th September, the B.E.F., anxious to use its new mobility, tries to push forward rapidly. It finds the bridges over the Grand Morin and Petit Morin destroyed, and their approach roads cratered. The divisional engineers will repair these passages with portable girders and trestle bridges—all for heavy loads—with wire track approaches. But these are mobile equipment bridges and must be replaced at once by heavy girders and other semi-permanent types in order that they may be available for the further advance. The approaches on essential routes too must be reconstructed to first-class standard. This is the duty of the corps and army engineers. We reach the Marne, a very serious obstacle 80 to 100 yards wide, held by strong mechanized rearguards and requiring a co-ordinated attack with a large programme of ferries, of light and heavy pontoon bridge construction and of bridge approaches. An operation requiring on the average certainly not less than five field companies on each divisional front of attack. Beyond the Marne again cratered roads and broken bridges. The marshy valleys of the Clignon, Alland and upper Ourcq, become serious tank-proof obstacles. The Vesle has to be bridged. The Aisne with its lateral canal becomes a serious engineer problem, while the heavily cratered roads running down the steep slopes to that river have to be rebuilt before the crossing of the river can be undertaken. These problems require large engineer concentrations at a time when corps and army engineer units are busy on repairing the rearward communications, replacing the temporary bridges and putting through roads fit for fast and heavy traffic.

What I am endeavouring to show is that where a country presents water obstacles, or even where the movement of lorries is mainly restricted to the roads, the engineer alone can keep the army in movement; and that the task of the engineer has immensely increased owing to the equipment and mechanization of the enemy. You may say that his resources have also increased, he also is mechanized and has new patterns of equipment. It is true, of course, that the mechanized

engineer loses little time and energy in movement from job to job. But a crater requires in 1938 as many man-hours and as much material for its repair as in 1918, and craters are likely to be far more numerous. They present, in fact, a far more serious obstacle than is generally realized or allowed on manœuvres.[1] Then again a pontoon bridge to take divisional loads, which in 1914, or even in 1918, could have been built in 2½ hours by 42 Sappers, would require to-day 7 hours and 90 Sappers, that is to say, six times the man-hours. No mechanization can replace actual men on such tasks. On the other hand, the time required to replace temporary by semi-permanent bridges has undoubtedly been reduced by the introduction of improved standard types, the use of mobile derricks, internal combustion pile drivers, and oxy-acetylene apparatus, and by the employment of pneumatic boring and cutting tools. These improvements should go some way to balance the increased demand for such replacements.

Now let us imagine that the front has to be stabilized as a defensive front where no natural anti-tank obstacle exists. The primary need to-day is then to create, if not a continuous artificial obstacle, at least tank-proof areas. The first item in the order of priority will be a comprehensive anti-tank reconnaissance of the defensive front followed by the improvement of natural banks and ditches, the blocking of defiles, the establishment of anti-tank minefields and even the making of lengths of anti-tank trenches and anti-tank barricades. These are tasks which will involve the engineers. They are new commitments since 1918—commitments which cannot, as yet, be met by mechanical appliances. And—as I mentioned before—we have now no longer available to help us the pioneer battalions and the large infantry establishments of 1918.

One thing which mechanization has done for us is that it has vastly reduced the water supply problem, but that problem was never a large one in moving warfare in a European theatre. It was in Palestine, Mesopotamia, and Egypt, that it assumed the proportions of a major engineer task.

ATTACK FROM THE AIR

Now let us turn from mechanization to another development—the air—in the sense of improvements in methods of air attack on ground targets. Has that affected the problem of the engineer? I think it has. I for one do not imagine that the enemy will waste his air resources

[1] As an illustration of this, an average crater, 30 feet in diameter and 7 feet deep, requires (failing the use of bridging equipment) some 20 to 30 tons of material and 200 man-hours' work at the site to open up a rough two-way route for normal traffic. In fact the engineer is here at least 20 times more efficient in destruction than in construction.

on the bombing of manufacturing plants and of open towns, when, at a critical period, those resources can be effectively used on the battle front, or against the communications on which it depends.

It is not easy to discover exactly what the efficiency of modern air bombing against bridges, roads and railways is likely to be. The air forces employed by Japan and by the contending sides in Spain are probably hardly up to European standards, and their energies seem to have been dispersed. I do not remember an instance where communications seem to have been permanently obstructed. There have been reports of the interruption of railways and the breaking of bridges, and we know that air attack on the bridges was largely responsible for the German lack of success at the crossing of the Marne at Dormans in 1918. On the whole, I suggest that we must expect that vital bridges, roads and railways (such, for example, as the pontoon bridges over the Marne in the example which we were considering) will be a target for concentrated air attack and may suffer serious damage. I understand that some foreign armies doubt the possibility even of maintaining such bridges at all during the daytime; and contemplate the possibility of having to dismantle and re-erect bridges (perhaps on alternative sites) daily. This would represent a new and serious demand on the engineers. Photographs of bomb craters in Spain, which have appeared in the Press, show the damage which an accurately placed or lucky bomb can do to road communications. We must be prepared for such damage, even although it may be exceptional.

CROSS-COUNTRY MOVEMENT

It has been said that the British Army consists entirely of generals and lorries, and it is a fact that the vast masses of vehicles in our mechanized army, together with the character of our manœuvre areas, tend to make the British Army very road bound. We ourselves proved in Palestine in 1918, and we have recently seen in Spain the danger of air attack on massed lorry columns. Such columns offer in particular a perfect target for low flying gas spray attack. We must get off the roads, and move across country. And although the modern vehicle is better adapted to cross-country movement, and although all arms are now to be trained to get themselves across country and to bridge small obstacles, I foresee that here again there may be a new and increased call on the engineers for which, in front of G.H.Q., manpower has not been replaced by machines.

Nor can we altogether ignore, I suggest, the danger of attack on vital points in our communications by parachute troops. The Russians are not the only Power which seems to contemplate their use.

Then there is so much talk nowadays of " air raid precautions," and we are becoming so air-raid minded that I cannot help thinking that wherever headquarters and rear installations are even temporarily stationary, there is going to be a loud clear call for air raid shelters, splinter protection, anti-gas curtains, and so on—perhaps even for tunnelled dugouts—which will demand the attention of the engineers. The fact that the engineers are now regarded as the experts and " parent arm " for anti-gas measures will tend, I feel sure, to increase the demand even for non-technical work.

The engineers of the army are responsible in war, as you know, for the Engineer Services of the Royal Air Force. The chief development here results from the increased speed of machines and their greatly increased loads. The effect of these factors is to be found in the increased dimensions of landing grounds and the greater necessity for a sound surface. This may make a call on the engineers for levelling, the removal of obstacles and the provision of stabilized soil, metalled or concrete runways. The maintenance of landing grounds against the effect of enemy bombing attack may also, I think, lead to a demand for engineers to stand by for this purpose.

CHEMICAL WARFARE

The only other sphere of development on which I have time to touch is " gas." We sincerely trust that it will not be used, but the possibility that our opponent may use it cannot be neglected. Improvements here in the practice of foreign nations appear to be an improved technique of ground contamination, and the use of large gas bombs and, more important still, the use of air spray. We may, therefore, find craters, road blocks and bridge sites heavily contaminated, and areas of contamination covering important approaches. While gas bombs, will, as I have said, add to the call for air raid precautions in back areas. The danger of low spray attack on lorry and marching columns will, as I mentioned before, tend to force us off the roads. Ground contamination and the danger of spray attack on the working parties will often force the engineers to work under gas conditions in protective clothing. This involves a reduction of 50 to 75 per cent. in their efficiency.

You may reasonably object that I have been talking in terms of Continental war, and Continental war, we are assured, is not, or ought not to be, " the British way in warfare." In other than Continental theatres it is generally true that river crossings and demolitions of bridges play only a small part. In their place, however, we have the immense problem of motor roads and of the increased amenities

demanded for modern armies. I ask you to compare the occupation of Nahakki in the Mohmand country in 1908, with the same operation in 1935. In 1908, the company of Sappers and Miners, which our Chairman commanded, constructed with the assistance of a Pioneer Battalion in two days by brute force an adequate camel road over the Nahakki Pass, and we thought ourselves rather advanced in wiring-in the village pond and pumping our drinking and animals water therefrom. In 1935, working parties of Sappers and of all arms rising to 2,000 men each day, with machinery equivalent to a further 400 men, were required for several weeks to construct a lorry road over the Pass, and a pipe line eight miles in length was laid over the hills to carry water to Nahakki.

Compare again the campaign in Abyssinia under Sir Robert Napier in 1867 with the recent Italian operations. In the former a weak division included no less than ten field companies and a corps of Beluchi labourers, but these numbers in no way compare with the vast body of military and semi-military labour employed by the Italians on their motor roads. The engineer units supported by road construction units were totally insufficient for the purpose and practically every man in the army was employed at one time or another on road work. Even so, these roads were in character and number far below those which would have been required in a war against a serious enemy.[1] It is true that road-making machinery and stabilized soil or mix-in-place methods of road surfacing, concrete mixers and other machinery add very greatly in such countries to our power to meet our problems, but such methods require the machinery to be ready on the spot with experts trained in its use.

CONCLUSION

I may be a pessimist, but wherever I look it seems to me that the developments since 1918, have largely increased the destructive power of the military engineer without any equivalent increase in his powers of construction; that where all are striving for mobility the engineer's power of creating obstacles to movement is advancing quicker than his power of overcoming them. It seems to me that the strategical and tactical employment of the Army depends daily more and more on the engineer and that there is an ever-increasing margin between what we shall be expected to do and what we can do.

How can that margin be reduced without a large increase in engineer establishments?

[1] It is perhaps not an exaggeration to say that a single efficient sapper company on the Abyssinian side might have so delayed the final dash to Addis Ababa as to have materially affected the course of the war.

I can only suggest :—

(*a*) That Commanders and Staffs must realize much more fully than they now do the engineer problem and the conditions under which the engineer can pull his full weight.

(*b*) That all arms must be much more self-reliant in field engineer work than formerly (that is the policy of the Army Council, and it remains for the troops to implement it).

And finally—

(*c*) That the engineer requirements of each possible theatre of war must be minutely examined and that wherever machines can help us they should be provided in peace and the engineer personnel trained in their use.

DISCUSSION

LIEUTENANT-COLONEL G. J. S. SCOVELL : I should like to ask what practical training young engineer officers get to-day in the most up-to-date methods of civil, mining and electrical engineering. For instance, are any of them ever temporarily attached to any of our foremost civil engineering contractors or mining firms, with a view to learning from hard practical experience the latest practice in, say, road-making, bridge building, reinforced concrete structures, piling, water drilling, demolition and explosives work, underground development, and so on ? Changes in technique are taking place so rapidly (I might say almost daily) in all practical forms of outdoor engineering, and more and more labour and time-saving machinery is being used. I should take up too much of your time were I to cite even a few, but I should like to say that to see £50,000 worth of plant on a £1,000,000 job to-day is by no means unusual. It therefore seems to me the more practical training young officers, inclusive of the rank of Captain, can get in relation to civil technique, competitive costs and, in particular, time and labour-saving methods, the more useful they will be in time of war. I am moved to say this partly by the fact that I have recently been sent an Italian brochure entitled " Roman Roads in East Africa," and partly because I used to be a regular officer myself, and since then, as the Chairman knows, I have become the head of a civil engineering, electrical and building firm of contractors with wide ramifications at home and overseas.

Frankly, I should like to see more and more of the younger officers, and perhaps even selected N.C.Os of personality and tact, temporarily attached not only to some of the pick of our great public works contractors, but also to our mining houses at home and overseas as well. I would ask you to imagine for a moment what a wonderful education it would be to an eager young fellow to spend six months in the Transvaal mining area under the best auspices. I can assure you that in these parlous days all of us have to be highly competitive and to work on the narrowest of margins. In the electrical world the same suggestion applies to the rapid erection or improvisation of overhead and underground lines and cables, modern road lighting and complicated electrical installations.

The more I see of things to-day, the more I am persuaded that the closer the collaboration, both in the drawing office and in the field, between the Services and civil life the better it will be for the country should an emergency ever arise. I was more than ever impressed with this when some eighteen months ago it was my lot

to travel back from Italian Eritrea on what amounted to a troopship and had the pleasure of many talks with some of Italy's ablest and most experienced military road engineers.

THE LECTURER: I am very glad indeed that this question has been raised, because it is a matter which I have very much at heart at the moment. As most of you know, the young engineer officer from Woolwich is required to take an honours degree in the engineering school at Cambridge, and he starts therefore as a well-qualified embryo engineer. Professor Inglis has said that no better body of young engineers is to be found in England and that their loss to civil engineering is serious.

A considerable number of officers of the Corps specialize in survey, railways, mechanical, electrical or constructional engineering. They attend special courses, and many of them are attached for considerable periods to civil firms. Owing to the shortage of officers, due to the expansion of anti-aircraft units, we are unable at the moment to fill all the posts that are offered. I feel very strongly that if a larger proportion of young officers could have six months or more with a civil firm it would be an extraordinarily good thing for the Corps and for the Army as a whole.

BRIGADIER-GENERAL W. W. SEYMOUR: One point that strikes me is the necessity for training the commanders and staff in the right way to employ the engineers. I imagine that the bridges to which the Lecturer referred are much the same as the old bridging train?

THE LECTURER: I was referring to the steel bridges.

BRIGADIER-GENERAL SEYMOUR: They will have to be kept more or less back to start with.

THE LECTURER: Yes, certainly.

BRIGADIER-GENERAL SEYMOUR: They cannot be kept too far forward, and if they are too far back they will not be there when wanted. I was going to suggest that the staffs will have a more difficult problem than ever. In the spring of 1917, when the Germans went back to the Hindenburg Line, the infantry arrived at the Somme, West of St. Quentin, where many little canals and the main river had to be bridged. The companies' equipment was not enough for that, and the bridging train was wanted. The bridging train, unfortunately, was still in the position where it had finally unhooked in 1914, on the Nieppe–Bailleul road, and it did not arrive for nearly a week.

THE LECTURER: The problem is easier nowadays, because in those days horses were used for the bridging trains, whereas now they have been mechanized.

THE CHAIRMAN

Although the subject was not mentioned by the Lecturer and is only remotely connected with the title of the lecture, I should like to take this opportunity of emphasizing a view, which I think is almost universally held by my brother officers, and which I have been putting forward for many years, that the horrible expression "R.E. fatigue" should be expunged from the infantry vocabulary. Why is it that, when the infantry soldier is most concerned with keeping himself alive and using his rifle in fighting, he should object to the manual labour that is involved in digging the trench in which he is to live? Why should he consider it to be somebody else's job to go and erect wire in front of that trench? I am talking, I admit, of 1914–18, and I have been out of the Service for some years, but I wonder very much whether that expression "R.E. fatigue" has not survived all our attempts to remove it from the military vocabulary. I may be behind the times, but I submit that, unless

the spirit has changed since 1918, a good deal still remains to be done to inspire the other branches of the Service with the ideal that their own personal protection is a matter for themselves to arrange.

With regard to a point that was raised by the Lecturer, and also by General Seymour, it strikes me that a great deal of emphasis should be laid upon training the junior officer and the N.C.O., and even the junior N.C.O., to think for themselves, to know what they have to do, and to act for themselves. The Lecturer has drawn a very graphic picture of the class of work which will face the demolition squads which the divisional and other engineers may have to supply in any modern war, especially in a highly developed country. It is quite obvious that the small number of officers in a field company will not be sufficient to find commanders for every demolition squad, when one takes into consideration the very large number of points at which these demolitions or blocks will have to be made in a short time and against what will certainly be a very mobile enemy.

Another point raised by General Seymour is that we must concentrate a great deal more on training our staff and commanders in how to employ their engineers correctly. The illustration which the Lecturer has given us and my own personal experience of following up the Germans in 1918 impress me with the fact that a great deal of forward thinking must be done in order to employ our engineers in an economic manner to stop the enemy from advancing, if we happen to be retreating, and, conversely, if we happen to be moving in the correct direction, to ensure that our engineers and their equipment are on the spot and available for use at the moment when they are required. General Seymour has given us a classic illustration of failure in this respect. Others were perhaps a little more fortunate in getting their bridging material closer behind the front line when we were following up the Germans in October and November, 1918. I wish to emphasize that it is not only the R.Es that have to be trained in this work; it is the staff and commanders also.

I thoroughly endorse Colonel Scovell's remarks on the importance of giving our young engineer officers (who are extremely highly trained as engineers when they have finished their course at Cambridge) opportunities for exercising their skill and their knowledge in the civil world. Many of the problems which they will have to face in the future are very similar to those of the civil engineer. The main difference is that, whereas the civil engineer has time in which to work out his problems and time to plot his lay-out, and one of his main considerations is cost, in the case of work in the field one is always working against time and the financial and economic aspects do not come into consideration at all. I encourage the idea of a very much closer liaison between military and civil engineers. After all, civil engineers will form the larger body of our military engineers in wartime, as they are the only source of expansion that we have for our very small peacetime cadre, and we shall have to rely on them as company commanders and for even higher positions. Many of them are men of great skill, who have been practising their particular profession all their lives, and once they have come into the military picture there is no reason why they should not carry out the work of a C.R.E. or of a Chief Engineer.

In conclusion, I should like to tell you of a personal experience of mine. In 1910 I was home on leave from India, and I volunteered to work for a month in the War Office. I was given the task of editing the first edition that ever appeared of "Engineer Training." I did a great deal of work in editing what somebody else had written, and I added such of my own ideas as I thought fit, and I handed the galley proofs to a senior officer who is now living but whose name I will not mention. The results of this month's hard work came back to me with the following remark in red ink on the proof: "This book gives an exaggerated idea of the importance of

engineers in wartime." Whether our experiences of 1914 to 1918 substantiated that criticism or not I am not here to argue; but undoubtedly, if that gentleman had been here this afternoon and heard what the Lecturer has told us and seen the graphic picture he has drawn of the very varied and onerous jobs which military engineers will have to carry out in wartime, I think he would be inclined to send for the galley proof and erase that remark.

It gives me particular pleasure to occupy the Chair this afternoon, because the Lecturer and I served together in the same company in India, and we have been close friends ever since. I remember well the advance over the Nahakki Pass in 1908, of which he gave such a graphic description. If it had not been for the existence of bits of track that had been made eleven years before, we should not have got over that Pass in the first day. Conditions are very different now. In those days we were working with jumpers, two men to each jumper. If we got into a bit of hard rock 2 feet of boring was a day's task, whereas it was done in a matter of minutes with the compressors that were used in 1935.

The customary votes of thanks to the Lecturer and to the Chairman were then carried by acclamation.

MILITARY ROAD MOVEMENT

THE 2nd DIVISION EXERCISE

THE 2nd Division carried out a road movement exercise during the period 28th–30th April, 1938, the object of which was to ascertain the quickest and safest method of moving a Division and attached troops (including Medium Artillery and Infantry Tanks) partly by day and partly by night, over a distance of about fifty miles in an area protected by our own troops but exposed to air attack.

The 2nd Division (Commander, Major-General H. M. Wilson) forms part of the Aldershot Command (G.O.C.-in-Chief, Lieut.-General Sir John Dill), and was at that time composed of :—

Divisional Headquarters.
4th (Guards) Brigade (1st Bn. Grenadier Guards, 2nd Bn. Coldstream Guards, 2nd Bn. Scots Guards).
5th Infantry Brigade (2nd Bn. King's Own, 2nd Bn. Leicesters, 1st Bn. Worcestershire Regiment).
6th Infantry Brigade (2 Bn. D.C.L.I., 2nd Bn. Dorsets, 2nd Bn. Durham L.I.).
3rd Hussars (mechanized).
H.Q. R.A.; X, XVI, XVIII Field Regts., R.A.; XIII Anti-Tank Regt., R.A.
H.Q. R.E., one Field Park Coy. and three Field Coys., R.E.
2nd Divisional Signals.
H.Q. R.A.S.C., Ammunition and Petrol Coys., Supply Column.
H.Q. R.A.M.C., three Field Ambulances and one Hygiene Section.
Provost Coy. and Divisional Postal Unit.

There were a few minor alterations in the above composition, but the main structure of the formation was as described.

The move of this complex organization over fifty miles of road affords a military problem of some magnitude, and one that requires special study. As a result of experience which has already been obtained, it seems that a Division with approximately 300 lorries for the carriage of marching personnel and with two roads available, can complete a move of fifty miles, at a density of five vehicles to the mile,

in the following times: At fifteen M.I.H.,[1] about eighteen hours; at twenty M.I.H., about thirteen and a half hours.

If additional units, such as Medium Artillery or Tanks, are attached, extra time will be necessary.

Whether to Move by Day or by Night

The first question that a Commander will have to answer will be whether to march the Division by day or by night. His decision must depend on an "appreciation" which will be governed by the following factors:—

(*a*) The time available for the move, particularly if the formation has to undertake a long march and then go into action at once.

(*b*) The comfort of the troops, including the strain on the drivers of vehicles.

(*c*) The power and activity of the enemy air forces and the possibility of our own air forces obtaining local air superiority during the period of the movement.

(*d*) The presence in the Division of easily "detectible" vehicles, such as Tanks, Medium Artillery, etc., which are distinct in shape from normal M.T. vehicles.

(*e*) The type of roads and traffic to be expected: the number of defiles and the network—or otherwise—of possible deviation routes.

(*f*) The time of year—i.e. long or short nights.

(*g*) Weather conditions and available meteorological data; i.e. cloud, fog, visibility, etc.

(*h*) The danger of troops being traced to their bivouac areas, if these are reached during daylight.

In view of the discomfort and relative slowness of night marches, it is considered that the greatest possible use should be made of daylight moves at densities of five vehicles to the mile, which are difficult to detect from the air. Night moves should, as far as possible, be restricted to special, slow or easily "detectible" types of vehicle.

Endurance of Drivers

A distinguished military lecturer once declared that, in any appreciation, "the man on the ground, in trousers"—or shall we say "the man at the wheel, in overalls"—should never be forgotten. Many promising

[1] M.I.H. is used to denote the average speed per hour, inclusive of halts. M.P.H. means the running, or cruising speed necessary to maintain the M.I.H.

manœuvres have, as he observed, failed to achieve success on service owing to the excessive fatigue of the troops.

These exercises, however, did not yield sufficient data regarding the limits of tasks which M.T. drivers could be called upon to perform in war, partly because the manœuvres lasted for only thirty-six hours and partly because at the end of April, there are only about eight and a half hours of darkness in every twenty-four.

The only drivers who were severely tested were those of the Reserve M.T. Coy., who had to carry out two trips. Vehicles of this company were on the road for over twenty hours out of a total of about thirty, and, in many cases, the original drivers worked unrelieved throughout. In some cases their eyes were strained and pupils dilated; but with about six hours' rest it is considered that they could have carried out another trip. After that, those drivers who were working without reliefs would have required a reasonable period for rest. Apart from eye-strain, night lorry driving without lights, or with dimmed lights, is a considerable physical strain on both mind and body.

Systems of Movement by Day

There are four main systems of movement by day. These may be described as :—

(*a*) The " Independent " or " Go as you please " system.
(*b*) The " Sector Timings " system.
(*c*) The " Controlled Dispersion " system.
(*d*) The " Small Group " system.

In the " Independent " system, vehicles are " fed into " the starting point from either the whole or part of a formation, and drivers drive at their most efficient pace, the faster M.T. passing the slower. The advantage claimed for this system is that the traffic is spaced unevenly along the roads, thus making the task of enemy air observers more difficult. A disadvantage is that control is lost from the time the move is under way until the arrival is complete. Vehicles of each group or formation will become intermingled along the road and complete units cannot be diverted to a new destination during the move to meet sudden enemy action or other tactical needs. The " Independent " system was considered unsuitable for the move carried out in this exercise, but there might be occasions—such as the march of maintenance transport along known roads—when it would be suitable.

In the " Sector Timings " system, infantry brigades, divisional artillery, etc., are allotted road sectors with timings at which their heads can enter and their tails must clear the sectors. This method is

useful if moving tactically prior to contact, for, by allotting " sector timings " to infantry brigade and other groups, their commanders are given the latitude essential for the disposal of their forces.

The disadvantages are that a formation, which is seriously obstructed, may be unable to clear its sector in time and the next formation will pile up on it ; it is also uneconomical in road time on account of the gaps which have to be allowed between formations to provide for a margin of safety.

The basis of the " Controlled Dispersion " system is a general movement by units at the maximum speed, consistent with comfort, safe driving and economical running. Every driver within a unit is instructed to keep approximately a certain distance behind the vehicle in front, the distance depending on the density laid down. Should a vehicle stop and not display the *Pass* sign, the next following vehicle stops at approximately the ordered distance from the halted vehicle, and this procedure is carried out throughout the column.

The following advantages are claimed for this system :—

(*a*) It provides for increased control as compared to the " Independent " system. The Commander at all times knows the progress of a move and can divert his formation or any part of it to a new destination.

(*b*) It causes the minimum of fatigue to the drivers, whose main and simple task is to drive at a comfortable speed at a safe distance from the vehicle in front.

The " Small Group " system resembles the " Controlled Dispersion ", method except that vehicles move in small groups between units, distances between individual vehicles and groups being laid down.

Except in special cases, the " Controlled Dispersion " system is recommended as being probably the best for general use. It combines the requirements of simplicity, control, speed, ease in driving and relative invulnerability to air attack to a greater extent than do any of the other systems.

Systems of Movement by Night

The decision as to the system of movement to be adopted at night will depend upon the visibility and the importance of secrecy. The difference between bright moonlight nights, when driving without lights is feasible, and moonless or dark nights, must be taken into consideration.

If secrecy is the predominating factor, columns must proceed with no head and side-lights at all or with only such lights as are necessary

for safety purposes. It has been found that driving on a single tail-light is most tiring to drivers. Tail-lights should, therefore, be either twin glowing and hooded lights (preferably one red and one blue), or else lights illuminating a surface, such as the differential.

If secrecy is not essential, vehicles should use more light and move faster, relying on speed and more open spacing to avoid casualties. With lights, it should be possible, even on dark nights, to use the system of "Controlled Dispersion" at speeds up to 15 M.I.H., and with densities of twenty vehicles or less to the mile.

Halts by Day and Night

By day, if the move does not exceed three hours' running, no halts are required. If the move is over three hours, a halt of about fifteen minutes is required after three hours. If the move is over 100 miles, a long halt of about one hour should be made.

Any system of unit food distribution during halts produces complications in finding suitable hiding places for units and offers opportunities to enemy aircraft. The personnel of each vehicle, therefore, should be given haversack rations, and each vehicle should halt at a fixed hour, well spaced out along the route and utilizing cover by the roadside.

When moving by night under conditions of extreme secrecy, ten-minute clock hour halts should be made at ten minutes to each hour; vehicles must not close up. At other times, halts should be similar to those for daylight moves.

Control Organization

In any movement of considerable size and length, some system of Regulating Posts is essential for the following reasons:—

(*a*) To observe and report to formation H.Q. the progress of the move.

(*b*) To reconnoitre suitable deviations and mark their entry posts and itinerary so that any unit, if obstructed, can get round by a reconnoitred and marked deviation.

(*c*) In general, to take all possible measures to assist the move, to deal with cratered roads, and to provide medical and gas decontamination detachments, and small stores of petrol, oil and lubricants.

The increased vulnerability of rail movements to air attack may be expected to result in greater use of M.T. in G.H.Q. and Army Areas. A highly developed control organization, therefore, will be required

throughout the L. of C. This organization may well be incorporated in the existing Provost organization, the additional staff required being drawn from personnel serving in peace with the A.A. and the R.A.C.

The status and responsibility of a Regulating Post Commander are those of a Staff Officer to the Force Commander.

Posts should be from 10–15 miles apart and should be located at or near the entry to their sectors. Adequate cover from the air should be available at or very close to the Post and, if necessary, camouflage must be provided, while the location of the Post must be studied with a view to W/T reception.

The whole Regulating Post system should be connected up by a series of up-and-down telephone or telegraph lines with cross-laterals between Posts for use in case of breakdown through air action or sabotage. The use of W/T, however, involves the disadvantages of the dangers of interception and the problem of frequencies.

The staff and equipment of a Regulating Post might include one officer and W.O., one soldier-clerk, one motor-cycle D.R., a small road patrol unit, a light truck for stores, tent and rations, and a 7-h.p. car for the use of the Post Commander. The Signals unit should be divided into two sections, the W/T Post and the Telephone Post, each including one N.C.O. and three or four signallers, together with one or two motor-cycle D.R's.

Distinctive Marks

In order to facilitate action by Regulating Posts, distinctive marks should be provided for all vehicles, both in front and rear. These marks must be sufficiently clear to enable guides and traffic-control personnel to identify and direct vehicles that may be approaching at 30 m.p.h. by day and at 15 m.p.h. by night. Standard serial numbers might be allotted to all units and formations within the Division and marked on a disc, which should have a distinctive colour for each arm of the service. An alternative method might be for each vehicle to carry a metal "board" as part of the vehicle equipment. One side should have "*Pass*" painted on it, while the other side should be left blank to allow for chalking the unit's name or other data.

Action in the Event of Road Blocks

Road obstructions in general may be caused by accidents, enemy air action or possibly by sabotage. The measures to be taken to obviate blocks on roads will include the following :—

(*a*) To prevent piling up of M.T.

(*b*) To reconnoitre the obstruction for possible local deviations.

(*c*) To clear away or fill in the obstruction and, if necessary, decontaminate it and organize local A.A. defences.

(*d*) To report the situation at once to the control organization so that the latter can assist in maintaining an even flow of traffic.

The direct prevention of the piling up of vehicles lies primarily in the hands of individual drivers, who—except in the "Independent" system—should always be told the minimum distance that they should maintain behind the preceding vehicle, unless and until the "*Pass*" signal is given. Drivers must also understand that when they see an obstruction which they cannot circumvent they should pull in to the side of the road, halt under cover, leave their vehicles and signal the "*Halt*" to following vehicles. At night they should give the "*Slow Up*" signal—a series of flashes on the "*Stop*" lights by means of the foot brake.

If the column halts unexpectedly at any time, the nearest officer or senior N.C.O., accompanied by a motor-cycle D.R. if possible, must act quickly on his own initiative. The following emergency action will be required :—

(*a*) Reconnoitre for a local deviation, across country if necessary.

(*b*) *Meanwhile* order another officer or N.C.O. to collect men to clear and, if required, decontaminate the obstruction and organize A.A. defence.

(*c*) If it appears that the obstruction is serious and that no local deviation is available, to inform superior authority of the situation.

The responsible officer will select the first suitable deviation and start the column off on the deviation route led by another officer or senior N.C.O. If the deviation route is selected from a map, a preliminary reconnaissance of the ground will normally be essential.

The power to order a major deviation should be restricted to officers of the status of Company Commanders or higher.

Transport of Marching Personnel

To effect the safe and speedy transport of the marching personnel of the Division, three main problems are presented. These are :—

(*a*) To determine the total strength of the marching personnel of the Division, which may on occasions be either more or less than the authorized War Establishment.

(*b*) To examine the existing establishment of a Reserve M.T. Company so as to provide an efficient lifting organization for the new type of Division.

(*c*) To lay down if, how and when, infantry trucks can reasonably be employed to assist in carrying the marching personnel of battalions.

Infantry trucks should only be emptied for the carriage of personnel in exceptional circumstances. The cohesion and tactical mobility of platoons and companies would be adversely affected until their trucks have been reloaded with normal gear and have rejoined. During active operations, moreover, situations might easily arise which would prevent trucks from reverting to their normal role.

The use of infantry trucks for carrying personnel must, therefore, be governed by the following principles :—

(*a*) Men carried in trucks must have with them sufficient arms and ammunition to enable them to go into action at once.

(*b*) Trucks must move with the Reserve M.T. Coy. lorries, if their separation would affect the tactical needs of the unit during the move.

(*c*) Certain trucks, such as Medical Officer's, Battalion Office, A.A. light machine guns and Coy. H.Q., should always retain their normal loads.

Some of the exceptional circumstances in which it might be necessary to use trucks for the carriage of marching personnel are :—

(*a*) To move A.A. detachments ahead for the defence of a route.

(*b*) To move ahead road-blocking detachments.

(*c*) To move ahead tactical or administrative reconnaissance parties.

(*d*) To move ahead one complete company when the tactical situation seems critical.

With the limited transport that is normally at the disposal of formations for carrying marching personnel—as exemplified by the Reserve M.T. Coys.—difficulties will occur in the rapid movement of a Division. It may be necessary to employ a Reserve M.T. Coy. on the " shuttle " system and to supplement it by using unit trucks for the transport of marching personnel.

In these days of motor-borne mobility, moreover, preconceived ideas of the real meaning of concentration must be drastically revised. For example, in pre-motor days one hour of time was the equivalent of 2½ miles of marching distance. To-day, one hour might well be the equivalent of 15 or more miles of motoring distance. The factors of time and space, which have always been the essential ingredients of the principle of concentration, have thus been fundamentally modified.

Enemy Air Reconnaissance

During the 2nd Division exercise, vehicles moved by day at densities of either 5 or 10 to the mile. At the higher density, aircraft flying at a reasonable height were able to observe the movement almost as soon as it commenced and to keep it under continuous observation on both routes. At the lower density of 5 vehicles to the mile the movement was not nearly so apparent to pilots, and the move of one artillery regiment actually remained undetected.

The decision as to the density to be ordered for a particular move will be influenced by many factors, such as the time available, local air superiority and weather conditions. Experience, however, tends to show that from the point of view of enemy air observation, there is a vast difference between densities of 5 and 10 vehicles to the mile; the selection of the lower density, therefore, may make the whole difference between an important move escaping detection or not.

It appears that the regular spacing of vehicles simplifies their observation from the air. This is a possible disadvantage of the "Controlled Dispersion" system, but at the lower densities, when vehicles are moving from 200–400 yards apart, it is considered that a regular spacing of vehicles is less likely to catch the eye of air observers.

During the early part of the exercise, the majority of movements, which were commenced by day, did not end until after dark, and movements that started after dark ended before dawn. Later in the exercise, certain movements started and ended in daylight. The difference from the air was most marked.

In the first case, due partly to the fact that the area was well wooded, no reliable air reports were received until long after dawn. In the latter case, pilots, who were keeping a steady stream of transport under observation by day, could definitely report that a number of M.T. vehicles had gone into hiding West of a given line, even though the actual area of concentration could not be accurately defined.

The deduction from this exercise is that as many troops as possible should enter the concentration area at dusk or during the hours of darkness. At whatever time troops enter a lying-up area, the utmost care must be taken to avoid detection from the air. Vehicles—properly camouflaged—should be hidden well inside woods rather than on the edges. Movement in daylight should cease completely whenever enemy aircraft are near. Bivouac tents and movements of troops are especially noticeable.

Air Attack

The exercise tended to show that large columns of M.T. keeping steadily on the move at low densities, on roads that are not obstructed,

have little to fear from air attack. The vehicles do not provide targets commensurate with the risks which either bombers or low-flying aircraft would have to run to obtain effect. Enemy bombers, however, may well be standing by to take action immediately reports of a suitable target are received from reconnaissance aircraft and may arrive on the scene within a comparatively short time. Under the " Controlled Dispersion " system, obstructions should not provide well-defined air targets.

To prevent hostile aircraft from obtaining a reasonably accurate idea of the area in which troops are concentrated, either before or after a move, may be difficult or even impossible. Bombing of such areas, therefore, will have to be reckoned with. In addition to measures of active A.A. defence, the widest possible dispersion should be adopted. With the development of M.T. and consequent increase of mobility, the need for concentrations in relatively narrow areas has now disappeared.

SOME DESTROYER EXPERIENCES IN THE MEDITERRANEAN

By "SEAFOX"

IN the last issue of the JOURNAL, "Walrus" gave us an account of events in the Mediterranean up to the beginning of 1937, as viewed from H.M.S. "Queen Elizabeth." It may be of interest to supplement this by one written from the viewpoint of one of the destroyers which were so intimately concerned with all the many forms of patrol established in those waters, and which spent many months in the various theatres of operations.

GUN-RUNNING PATROLS IN PALESTINE

Shortly before the dispersal of the Fleet from Alexandria in 1936, the Commander-in-Chief issued a provisional programme of movements; and it was with mixed feelings that those of us serving in the First Destroyer Flotilla read the signal, when it was seen that one Division of our flotilla was to proceed to Palestine to relieve the Fourth Flotilla. At 6.30 a.m. on 13th July the Second Division sailed for Haifa, arriving the following day to find the leader and half a dozen ships of the Fourth Flotilla raising steam, their paying-off pendants flying bravely in the evening breeze. We anchored outside while the turnover took place. Then, about 8 p.m., the Fourth Destroyer Flotilla slipped and left harbour, cheering the "Arethusa"—flagship of Rear-Admiral d'Oyly Lyon, as they left. No one at that time suspected a flare-up which would defer their paying-off until they had completed nearly three years in commission. As the Fourth Flotilla slid out of sight to seaward, we weighed again and entered harbour, securing to berths alongside the Oil Dock Jetty.

Almost immediately we commenced a series of coastal patrols, two ships sailing at a time and remaining at sea for forty-eight hours, though this arrangement was later modified. These patrols were designed to counter any attempt by Arab terrorists at gun-running by sea, and for a time at least they proved a novel and amusing diversion. We used to stop all small craft intercepted along the coast—mostly melon-carriers no longer than the armed whaler which we put down to examine them.

They seemed used to the formality, and we always parted the best of friends, often with a present of a few melons into the bargain. At times we made ourselves quite useful; for example, one ship stopped a small boat in ballast only, and ordered her into Tantura for examination. The craft was run up upon the tiny beach and half a dozen sailors commenced to shovel out the shingle ballast, to see whether it contained any hidden weapons. None were discovered, but as the Arabs had been going to Tantura anyway, and would have had to unload their ballast before embarking their cargo of melons, they were delighted with this assistance.

Haifa itself at this time was well garrisoned, but during our short spells in harbour when off patrol we were usually at short notice for an emergency. On one occasion the Fourth Sub-Division was ordered to be prepared to land a platoon to assist in the defence of certain strategic points in the town, during a turnover of infantry detachments. The sailors were keen for a break in routine and were all for landing, but in the end the platoon was not required, and they divested themselves of their steel helmets and webbing, and returned to cleaning ship—with some reluctance. Occasionally we were able to get ashore, when we would visit Pross's beer-garden. It was there that we heard the only explosion during the whole of our time in Haifa—a bomb bursting on the other side of the town.

Events in Spain

It was while we were at Haifa that the Spanish flare-up developed into civil war, and on 4th August the Second Division was relieved by a division of trawlers and left Haifa for Malta, docking down on arrival and being immediately taken in hand for an abbreviated half-yearly refit. On the 18th we sailed again, this time for Spain.

I can well remember the first sight of that country in the early days of the struggle. The Division had separated in the early morning of the 21st, and our own destination was Alicante. It was a lovely day, and as the blue hills of Spain shimmered through the haze, we sighted the "Douglas," on her way from further down the coast. As we made our pendants to her, she signalled: "Abandon hope, all ye who enter here"—an apt quotation which frequently recurred to memory during the next two years. At Alicante we found the cruiser "Despatch" alongside the mole, and at anchor in the bay was a veritable international squadron consisting of an Argentine battleship, two French flotilla leaders, an Italian destroyer, and a Portuguese sloop. Shortly after our arrival a German armoured ship—the "Deutschland," I think

it was—was sighted, and presently anchored amongst the assembled ships.

Alicante was at this time the departure point for most of the refugees from Madrid, although a few managed to get to Valencia. Immediately we were enrolled in the ferrying organization which had been instituted when the war broke out, and which ran so well for so many months. Embarking refugees early in the forenoon, we would run up to Valencia, anchoring overnight and transferring our passengers to the " Resource," which for some time acted as a depot ship at that port. The second day's run would take us to Barcelona, where there was always a ship of the First Cruiser Squadron moored in the harbour to collect refugees from the neighbourhood and to sort those we had brought from the southern ports. The third day's run usually started about 5 a.m., and brought us to Marseilles in the middle of the afternoon. There the refugees were disembarked and we were able to give our crew a welcome night's leave before starting the return trip next day. This included a call at Palma.

It was interesting work, and although there was always the underlying note of tragedy behind it all, I can recall many amusing incidents. There was the old Irish lady who objected strongly to being removed from Spain after a lifetime spent in that country, and whose wrath was such that we persuaded the doctor to quieten her with a dose of bromide; the injection must have been a strong one, for when we got to Marseilles she was still sleeping soundly and it took a large quantity of very black coffee to bring her round sufficiently to be put ashore. There was the Dutch girl and her Swiss boy friend who, with the equivalent of a pound between them, had every intention of seeing the sights of Europe on their way to her parents in Holland. And there was Miss Czecho-Slovakia 1936, the only refugee embarked on one trip from Palma, who enjoyed her passage enormously and even joined us in the water when we stopped and piped hands to bathe.

We spent a month on this work, in which time my ship alone accounted for two or three hundred refugees. On 14th September the " Grenade " and " Griffin " sailed for Malta, followed shortly afterwards by the remaining ships of the flotilla on relief by the Third Flotilla, and we spent four weeks " resting "—which included a certain amount of exercising—before sailing again, on 12th October, for the Western Mediterranean.

Cartagena

On our arrival the Third Flotilla returned to Malta, in company with the Rear Admiral (D) in the " Galatea." This time the First Division was

sent to the southern area—Malaga, Almeria and Cartagena, and ships took it in turns to act as S.N.O. at these ports, returning to Gibraltar for a stand-off after each spell of duty. About 11th November the Second Division, which had been doing the usual ferry trips, took over the duties of S.N.O. at the southern ports, the First Division reverting to ferrying duties. It was the " Glowworm " which was actually lying off Cartagena on 22nd November when the Government cruiser " Cervantes " sallied forth from the harbour and anchored in the bay outside, to be torpedoed shortly afterwards by an unknown submarine. On 27th November the cruiser " Baleares " made her first public appearance as a unit of the Nationalist naval forces. She had been under construction when the war broke out, and was a valuable addition to Franco's fleet until she was sunk, with the loss of over six hundred lives, early in 1938—less than eighteen months after being first commissioned.

At the end of the month our flotilla was again relieved by the Third Flotilla, and sailed for Malta, arriving in Lazaretto on 2nd December. A certain amount of jubilation on the part of the married officers and their wives, all of whom considered that this stand-off was bound to last over Christmas, proved to be unfounded, for a fortnight later, on 17th December, we again sailed for Spain, the Third Destroyer Flotilla returning to Malta on relief, for Christmas and the New Year celebrations as well. During this, our third spell in Spanish waters, we were employed partly in ferrying refugees and partly at anchor off the various ports. Christmas was spent by my ship four miles off Alicante, with the depot ship " Woolwich " for company. The sailors had an *entente* with a couple of British merchantmen anchored closer inshore, and a present of cigarettes and some beef from our refrigerator helped to brighten an otherwise dull day for them.

The Coronation Review

On 16th January, 1937, after a spell at Palma, we returned to Malta. About this time the new Second Destroyer Flotilla commenced to make their appearance on the station, and the sight of the " H-boats " in Sliema Creek aroused considerable interest. On 27th February we sailed again, this time with the Fleet, to take part in Combined Exercises. These were chiefly notable for the heavy swell which prevented the destroyers from playing a large part in the first phase, and which caused the second phase to be held inside the Mediterranean. On the second day out from Gibraltar, we were steaming into such a heavy swell that our speed was reduced to 10 knots and the battlefleet overhauled us. The " Queen Elizabeth " and " Barham," plunging through our lines at 17 knots on their way to engage the enemy, were a magnificent sight

with seas breaking over their forecastles and their decks awash as far as " B " turret. Their " A " turrets were trained right aft to prevent damage to the guns.

On completion of the exercises and on the dispersal of the Fleets, the Second Division returned to Malta to dock, the First Division remaining to take a turn of duty in Spanish waters once again, relieving Third Flotilla ships in the northern area. For a wonder, we were able to complete our full six weeks refit undisturbed, and a modification to the after group of oil fuel tanks provided us all with a fortnight's " lodging and compensation "—very gratifying to the " natives." The refit was completed in time for us to sail with the Fleet for the United Kingdom, where most of the Mediterranean units were to take part in the Coronation Naval Review, and on 3rd May we left Malta for Spithead, leaving the newly-formed Second Destroyer Flotilla to hold the fort in our absence. On the evening of the 13th we anchored in Freshwater Bay, prior to taking up anchor berths at Spithead the following day. That same afternoon the " Hunter," on patrol off Almeria, struck a drifting mine, sustaining severe damage and the loss of eight lives—an unlucky start to a new commission.

After the Review the week's leave to each watch provided a welcome and unexpected break. A sad accident occurred on the return passage : the captain of the " Gipsy " fell from the top of the bridge ladder to the iron deck, and died shortly after. He was buried an arrival at Gibraltar with full naval honours, and the " Gipsy's " First Lieutenant assumed temporary command until the arrival of a new commanding officer.

For the next five weeks the First Destroyer Flotilla was based on Gibraltar and employed on Non-Intervention patrols off the southern Spanish ports. The First Division relieved Second Flotilla ships off Cadiz, Guadalquivir, and Huelva, and the Second Division those off Malaga and Almeria. About 20th June the two Divisions changed rounds, and my ship commenced patrols off the south-western ports. A number of German warships were based on Huelva about this time, and we frequently passed the " Graf Spee " and " Nürnberg," together with several torpedo boats and sometimes a submarine or two. On the 19th we left the Western Mediterranean, and arrived in Sliema Creek, Malta, on the 23rd.

Haifa Again

The " Grenade " was detailed to relieve the " Hasty " at Haifa, and on 1st August we sailed for Palestine. This time there were no patrols to be carried out, and we remained alongside the Oil Dock Jetty throughout our fortnight of duty. Things were quieter than the previous year,

and we were able to land more often, and even to send picnic parties (with the help of the R.A.O.C.) as far afield as the Sea of Galilee. We had a strong *entente* with the Army, notably the Essex Regiment and the R.A.O.C. ; the Hampshires were in camp a mile or two to the southward of Mount Carmel, and were more difficult to get at. This culminated one evening in a " Grand Water Carnival," when our ratings challenged the soldiers to compete in swimming races, diving competitions, greasy pole, and other forms of water sports. This proved extremely popular, and for a few hours at least, wars and rumours of wars were forgotten, and a good time was had by all.

Practically the only disturbance which occurred in Haifa during August was a fire which broke out on board the S.S. " Tel Aviv " in the early hours of 8th August. The " Tel Aviv " was the only vessel still belonging to the Palestine Steam Navigation Company, and had long since been paid off and laid up. She was frequently being fired or cut adrift by local terrorists, and the Navy was constantly being called upon to bear a hand. On this occasion three fire parties were quickly in attendance—the local Volunteer Brigade, drawn from the large German element in Haifa ; the Marine Police, complete with two harbour tugs fitted for pumping Foamite ; and a party from the " Grenade." The outbreak had started in the after lower hold, but was not very serious or of great extent. The after hold was gutted, but the flames were subdued before further damage was caused.

We spent nearly two weeks at Haifa, before being relieved on 13th August by the " Protector." Stores were transferred, and then we sailed for Malta and rejoined the Fleet.

The Nyon Patrols

Increasingly frequent attacks on merchant shipping by submarines and aircraft brought about the Nyon Agreement, and the signatory Powers decided to make a display of force in the Western Mediterranean. On 16th September, the majority of the First Flotilla sailed for Oran, followed a day or two later by the " Grenade " and " Griffin," which had remained in Malta to make good defects. For the rest of that month and throughout October we were employed patrolling in the vicinity of the routes laid down for merchant ships by the terms of the Agreements. At first every available ship was used for these patrols, supplemented by flying boats based on Malta and Oran, and the results were truly impressive. With twenty-seven destroyers always at sea, attacks on merchant shipping ceased immediately. The patrols proved of considerable value in more ways than one, and it is true to say that "although no hits were obtained, many useful lessons were learnt." A proportion

of the H.A. armament was always manned by day, while ships' companies went to cruising or defence stations by night, so that all hands were kept fully occupied under what almost amounted to war conditions; for we had to be prepared for attack whenever we were at sea. It was not until the Italians joined in some time later that the allocation of responsibility was revised and areas were divided between the three navies. In the Aegean, the " Repulse," based on Mudros, had a division of destroyers under her orders to patrol the Nyon routes in conjunction with the battle cruiser's aircraft.

Early in November the First Flotilla was again relieved in the Western Mediterranean and returned to Malta on the 6th, the First Division remaining for a while, the Second Division sailing almost at once for the Aegean to relieve ships of the Second Destroyer Flotilla. It was during this period of duty that the S.S. " African Mariner " was intercepted and escorted to Malta for examination and search. This ship, said to be carrying war materials, was known to be on her way to Spain from Russia, and constant air patrols were maintained by the " Repulse," then at Phalerum Bay. Early one morning the vessel was sighted and reported by an aircraft. The " Greyhound," " Grenade " and " Glowworm," all lying at Mudros, raised steam immediately and sailed to intercept her. She was stopped off Cape Matapan by the " Greyhound," who escorted her to Malta where she was detained for some weeks while the cargo was searched for prohibited articles. She was finally released as nothing illegal was found.

The Second Division was relieved by the First after twelve days in the Aegean. On the day that the First Division arrived, the Commander (E) of the " Repulse," who had developed blood-poisoning, was transferred to the " Grenade," to be rushed back to Malta at 25 knots for treatment at the naval hospital.

Back to Spain

After an uneventful winter, March saw the Combined Fleets once more engaged in a series of tactical and strategical exercises. These took place in the Atlantic under the most perfect weather conditions, after which, on 25th March, the First Flotilla sailed again for Malta. After a month of gunnery and torpedo practices, marked by some very successful firings at the target ship " Centurion," the flotilla sailed again, on 22nd April, for a final month in Spain prior to paying-off. This period involved little in the way of patrols, and the flotilla was based at Gibraltar, one sub-division at a time being despatched to cruise off Valencia. This patrol was later abandoned, the two destroyers which constituted it being used to run mail trips from Palma for the ships in

the eastern area. A Straits patrol was maintained each night by the vessels at Gibraltar, sailing at 5 p.m. and returning to harbour at 6 a.m. each morning, but no " incidents " occurred.

On our last mail trip we called in at Valencia and Caldetas on our way to Marseilles, remaining the best part of the day at each of the two former places. Two or three of us landed at Valencia and we spent a forenoon in the city. It was an interesting experience, and I think we were all amazed at the " business-as-usual " air which pervaded the place. The streets were thronged with people—as many men as women and children, and comparatively few in uniform. Trams were running, and all the shops were open. It seemed incredible that the Nationalist lines were at that time only thirty or forty miles from the city. Only towards midday, when long queues began forming outside certain shops, did we realize what war must mean to the civilian population. There was a serious shortage of several commodities, particularly oil and soap, and Valencia was feeling the pinch. Franco's stranglehold certainly seemed to be taking effect.

At Grao, the port of Valencia, there was more evidence of the frequent raids carried out by Nationalist aircraft than in the city. Several ships, bombed from the air, lay sunk or half-submerged alongside the wharves. Harbour facilities were dislocated, and half a dozen merchantmen of various nationalities lay at anchor outside awaiting an opportunity to enter the harbour and unload their cargoes. We inspected a British collier, the " Greatend," which had been struck by bombs both forward and aft, and was later sunk. At this time she was lying heeled over alongside a small mole, the water lapping sullenly only a few inches below a gaping hole in her starboard side. She had caught fire when hit, and her living spaces and bridge had been completely gutted. When we saw her, the crew were living ashore awaiting orders from home.

The End of the Commission

On 27th May the whole of the First Destroyer Flotilla was once again assembled at Gibraltar. Eight of the nine ships were lying alongside the South Mole, one astern of the other, only the " Grenade," which had been the last to arrive, being alongside the Dockyard wall. All had paying-off pendants flying, and spirits were high at the thought of returning home after two very strenuous years. During the previous week-end the Czechoslovak crisis had occurred, and for twenty-four hours we were all very worried as to the outcome. It was not until we had slipped and were well on the way home that we again allowed ourselves to think of paying-off ; and not until we were finally docked down in our home ports did we feel really safe.

On 31st May the Devonport and Portsmouth ships of the flotilla arrived in England, and that night the Chatham ships anchored off Sheerness, only to find after many months of darkening ship in real earnest an air raid exercise in progress which necessitated our darkening ship yet again! We heard afterwards that the Commander-in-Chief, Nore, had issued strict orders that the returning ships were not to be involved, but the orders arrived too late to be of any practical value.

So ended the first commission of the First Destroyer Flotilla, after more than two years of "standing by to stand by," during which time we were frequently divided and barely managed even to work up as a flotilla in the first instance. It had been a busy time for all concerned, but the ships and personnel stood up well to what was demanded of them. Out of those two years, nearly eight months were spent actually in Spanish waters, six weeks in the Aegean, and six weeks in Palestine—a total of nearly a year under what practically amounted to active service conditions. In that time my own ship steamed close on 65,000 miles—almost double the distance steamed by the "Wishart," our predecessor, in the previous First Flotilla, in a normal two and a half years. It was interesting work and, although it necessarily involved many restrictions in the matter of leave, all hands appreciated the opportunity of studying at such close range a war which has already lasted for over two years, and which looks as if it may remain for a long time to come, a stumbling-block in the way of peaceful international relations amongst the European Powers.

STRATOSPHERE RESEARCH FLYING

By Squadron Leader F. R. D. Swain, A.F.C., R.A.F.

IN a short article, such as this, it is only possible to give a general idea of a few of the problems and points of interest in connection with Stratosphere Research Flying in the Royal Air Force. As for the history of high altitude flying, from the time when the first record was established twenty-nine years ago, it must suffice to say that since 29th August, 1909, when a Frenchman by the name of Latham astonished the world by reaching the remarkable height of 509 feet, until the present day, when the record stands at 53,937 feet, research and development have progressed in this, as in every other aspect of aviation.

The Stratosphere

Extending high above the surface of the world is miles of what we call atmosphere. The weight of this atmosphere presses down on the earth so that near the surface, especially at sea level, where the compression is naturally greatest, it becomes heavier and more dense. In actual fact the density at sea level is more than eight times as great as that at 50,000 feet. The atmosphere is made up, in addition to the particles of air, of numberless molecules of water vapour, dust and smoke particles, and carbon dioxide. The temperature of the air in general decreases fairly steadily with increased height, until it reaches about 50° Centigrade below freezing point, at which stage it alters very slowly with altitude. This level is known as the tropopause, and divides the lower atmosphere, or troposphere, from the stratosphere.

The base of the stratosphere commences at heights which vary according to such considerations as latitude and temperature. For example, in the British Isles it commences on the average some 40,000 feet above sea level, whereas at the North Pole it would commence at a lower height, and at the Equator a greater one. In the stratosphere, owing to the very low temperature, the atmosphere is able to retain only an extremely small quantity of moisture, with the result that clouds are unable to form. Also, because of the distance from the surface of the earth, the air is free from smoke and particles of dust, and is therefore very clear and the light extremely bright. Again, owing to there being no smoke and dust particles to break up the rays of light, the sky above becomes a deeper blue until eventually it is black.

It is at present impossible to estimate accurately the velocity of the winds in the stratosphere, but from evidence of the drift of the highest clouds observed (30,000 feet), experiments carried out with free balloons equipped with instruments, and information obtained from the few stratosphere flights which have been made, it has been found that wind velocities vary from almost calm up to about 200 m.p.h.

Human Limitations

In recent years high altitude flying appeared to be limited, not as might be expected, by aircraft and engine development, but by the human element. The few pilots who flew at heights in the region of 43,000 feet complained of physical exhaustion, and of the constant fear and feeling that they were about to lose consciousness any moment. There is no doubt that these fears were fully justified, and on more than one occasion with disastrous results. It seemed as if at last the machine had outstripped the man. This was quite a new aspect, as before the problem had always been how to force the aeroplane a few feet higher.

It was about this time that a decision was made to carry out a series of tests with the object of trying to discover the limit of human endurance. It is necessary to pause here for a moment to see how the problem was attacked, and with what results .

Experimental Low-Pressure Chamber

At the Royal Aircraft Establishment, Farnborough, there is a chamber, known flippantly by the test pilots as the " Death Chamber," but by the more serious-minded as " The Low-Pressure Chamber." It is cylindrical in shape, capable of accommodating four men, and can be made airtight. It has sealed windows all round to enable those on the outside to observe the reactions, and sometimes very unusual expressions, of the willing but unhappy victim on whom the test or experiment is being performed. The victim's one consolation is that he has a microphone which allows him, even when in the chamber, with the door closed and sealed, to communicate with the outside world. The furniture consists of a table, a couple of chairs, an altimeter hung on the wall, and the required number of sets of oxygen equipment. By pumping air out of the chamber by means of a motor pump, it is possible to reduce the atmospheric pressure inside to the equivalent of any desired height up to 88,000 feet.

Various pilots, no doubt with the feeling that they were shortly to become martyrs to science, allowed themselves to be tested in this chamber. From the data obtained, it was discovered that the average

100 per cent. fit human, even if supplied with an unlimited quantity of oxygen, is unable to retain consciousness at heights above about 43,000–45,000 feet. This is owing to the fact that in excessively low pressures the lungs are unable to absorb sufficient oxygen to enable the human body to function properly. All these tests were of course carried out using oxygen equipment. As a matter of interest it was found that at 40,000 feet, if the supply of oxygen is stopped suddenly, the pilot loses consciousness in the space of about 45 seconds. Further experiments were made without the use of oxygen, and these results differed considerably. Some pilots were able to retain consciousness up to 26,000 feet, whereas others reached their limit at a height not above 19,000 feet.

The net result proved that if it was desired to fly at altitudes above 40,000 feet it was essential to build up, by some artificial means, sufficient pressure to enable the lungs to function. In order to overcome this difficulty there was the choice of using either a sealed cockpit, or providing a special suit in which it was possible for the pressure to be built up. A pressure suit, which seemed to have the necessary requirements, was invented by Sir Robert Davis and the late Professor Haldane, in conjunction with the Air Ministry. The preliminary tests proved to be favourable, so it was decided that it should be given a fair trial. Further tests were carried out up to the equivalent height of 80,000 feet in the low-pressure chamber, and the report stated that there was no greater discomfort experienced in breathing than when using standard oxygen equipment at 40,000 feet. As it was impossible to heat the suit owing to the inflammable texture of the material, an element of doubt arose over the question as to whether the pilot would be able to stand the cold due to excessively low temperatures. A final test to decide this was made at Siebe-Gorman's Works in London, where there is a chamber in which it is possible to reduce the temperature. The test was made in a temperature of 70° C. below zero, and, apart from slight discomfort, including a touch of frostbite on one finger, the pilot reported the result as satisfactory.

Special Pressure Suit

The suit produced was made of rubberized fabric, and fitted with a helmet of the same material. Mounted on a frame and let into the helmet was a large curved double window made of two layers of celestroid. Between the two layers was an air space, left with the object of assisting the helmet to keep warm. The suit itself was constructed in two pieces and joined by a clip around the waist.

The breathing circuit was what is known as the closed type. The oxygen was fed into the circuit at the required rate by a jet which was the driving element in a small injector. This injector produced a rapid circulation of gas round the system. From the injector the gas passed through a flexible tube which entered the helmet on the left side of the pilot's face and passed across to an outlet on the right. The gas containing the exhaled breath passed down a flexible tube to a canister containing chemicals to absorb the carbon dioxide and moisture collected. The gas then issued from the canister outlet as pure oxygen and continued to be circulated through the system.

The various parts of the equipment, such as the inflation and deflation controls and the gauges registering the pressure in the oxygen cylinders and suit, were placed in positions where they could be seen and operated with the greatest ease. A panel was incorporated in the helmet and fitted with a zip cord to enable the pilot to free his head from the suit in the event of a failure in the oxygen circuit. Later, after a number of flights had been made in the suit, it was found necessary to fit a dryer at the side of the helmet for the purpose of removing any moisture which might collect in the air space, between the two layers of celestroid in the window of the helmet.

Training for High Altitude Flying

It has been stated by the Royal Air Force medical authorities that no excessive strain is placed on a pilot when flying in the stratosphere, and that no special physical training is necessary. This, is of course, presuming that he is physically fit in every way. From practical experience pilots engaged in this type of flying have found this theory to be correct. Provided the man keeps fit in the normal way and does not over-indulge in late nights, alcohol and tobacco, that is all that is necessary from the physical aspect.

As a safety precaution, however, the pilot is always subjected to preliminary tests in the low-pressure chamber before being selected for high-altitude flying. This also serves the dual purpose of allowing him the opportunity of becoming used to the effects of low pressures and the use of oxygen, as well as the chance to gain experience in the use of the special equipment.

The Aircraft

The two main factors in the construction of an aircraft designed for high-altitude flying are *lift* and *climb*. In order to obtain these, the aircraft must have a large wing area giving a low wing loading. These factors were very carefully considered before the finished article was produced in the form of the Bristol 138.

To ensure lightness the airframe was constructed of wood, except for such essentials as the engine mounting and cowling. By this means the wing loading was reduced to about 8½ lbs. per square foot. It is interesting to note that although the all-up weight of the aircraft was 5,310 lbs., the stalling speed was only 42 m.p.h., and the normal landing speed about 51 m.p.h. In order to keep the pilot warm the cockpit was heated internally. A sliding roof was fitted to enable it to be opened or closed by winding a handle. This roof was also fitted with a quick release to ensure instantaneous opening in case of emergency.

One problem which caused much thought was that of how to overcome the possibility of the controls freezing up, because if such a situation arose the safety of the aircraft in low temperatures might be jeopardized. This was eventually solved by fitting controls with ball bearings. The ball bearings were first dipped in thin gun oil, drained off, and then fitted in locked and sealed compartments.

Another problem of interest was how to prevent the pilot from being temporarily blinded by the extremely bright light in the stratosphere. Various ways and means were considered before it was found that by painting the top surfaces of the aircraft and cowling dull black the reflection of light was cut down sufficiently to overcome any grave discomfort.

The engine installed was a Pegasus P.E.VI.S. Its most interesting feature being the addition of a special "Two-Stage Blower" which enabled it to develop a maximum power at great height.

Owing to the unusual atmospheric and engine conditions at extremely high altitudes it is necessary for special fuel to be used. A very high degree of supercharge is required to maintain adequate engine power in rarefied air, and it is therefore impossible to avoid a high mixture temperature. As this tends to promote detonation, it is essential for the fuel to have a high anti-knock value. After extensive experiments in the laboratory and in the test bed, a 100 per cent. fuel known as S.A.F.4 was developed from the standard grade.

With regard to oil, again the unusual conditions necessitated research work, and as the result of laboratory research a standard grade of aviation oil was chosen as the most suitable.

Conclusion

The time is past when people question the usefulness of a discovery unless it shows that it has immediate and practical value. A good woman once asked Faraday, what was the use of his first dynamo? He replied with the counter-question: "My dear lady, what is the use of a

new-born baby ? " His answer should be a lesson, for it has been left for us to see the full value of the dynamo.

At present it is impossible to state to what extent the world will benefit from the exploration of the stratosphere, but it is known that there are a number of military and scientific advantages to be gained. From a military point of view the advantages are fairly obvious. Owing to the rarefied air and resultant decrease in drag, greater speeds will be attainable ; also the high winds in the stratosphere may be put to profitable use. Aircraft may be enabled to fly in undisturbed air, out of sight, unheard, and out of range of guns. Civil aircraft will, of course, also reap the benefit of some of these advantages.

As regards the scientific side, there appear to be even further possibilities. Apart from assisting cosmic ray research, scientists are convinced that a knowledge of the upper regions will enable accurate forecasts of weather conditions to be given weeks and even months ahead. At present, little more than 60 per cent. of the weather forecasts can be claimed to be accurate, and it is impossible for these to be given more than a few days in advance. If the successful exploration of the stratosphere is able to unravel the mysteries of forecasting weather, this alone will have proved its worth ; for it will enable precautions to be taken and preparations made in advance to combat such calamities as floods and hurricanes, which in turn will be the means of saving life.

PHOTOGRAPHIC OPERATIONS OF THE ROYAL CANADIAN AIR FORCE

By Squadron Leader C. R. Slemon, R.C.A.F.

THE Royal Canadian Air Force is fortunate in having as one of its regular peacetime activities an important task with a strong adventurous attraction and involving operations in the remotest and least explored parts of Canada. This is the execution of a vast programme of air photography. The work is arduous, but besides contributing greatly to the country's development, it provides training and experience which would otherwise be difficult to obtain ; moreover, it is exceedingly interesting, and there is keen competition for it amongst the Service personnel. Although machine guns, bombs and torpedoes have no place in photographic operations, there are few other branches of R.C.A.F. work which render such material value to the people of Canada in peacetime. A brief description of these operations may, therefore, prove of interest.

First, however, it may be worth while examining the reasons for the growth of these operations. It is perhaps only natural that Canada should find herself a world leader in air photography, for this form of survey is admirably suited to conditions of the country and the Government has therefore concentrated on the development of this new science. Canada's population, railways and roads have been confined almost entirely to a comparatively narrow belt of territory in the South, where cultivation has been easiest, with the result that the vast northern territories have, until the advent of the aeroplane, escaped serious exploitation. This has been due largely to the fact that travel in the rough North country has in the past been confined to water routes which, although provided in abundance by the countless rivers and lakes, permit only slow and arduous progress and which are free of ice for only a few months of the year. Now, however, the new era of air transportation has almost eliminated the inaccessibility of Canada's northland with its great resources.

A demand for suitable maps has naturally grown with the opening of this vast new territory, and has resulted in the development of an accurate method of survey by air photography which is easier, comparatively cheaper, and immeasurably speedier than ground survey.

As a result, a new and accurate map of Canada is taking shape. But it is not only for mapping of these remote areas that air photography is being utilized; there are many other purposes for which it is now considered essential: agricultural development, the timber industry, game preservation, fisheries, the mining industry in particular, and indeed most activities associated with the exploitation of Canada's natural resources. All these claims resulted in air photography becoming an increasingly important part of R.C.A.F. work since 1921. This culminated in 1931, when the greatest activity occurred, there being thirty aircraft employed on photographic operations. In recent years economy has somewhat curtailed these efforts, and now one squadron, comprising twelve aircraft, is allocated to this work. This is No. 8 (General Purpose) Squadron, with Headquarters at R.C.A.F. Station, Ottawa. It provides five mobile photographic detachments which operate as required anywhere in the Dominion. Four of these detachments consist of two aircraft each, while the fifth detachment comprises one only, and it is these nine aircraft which now carry out the bulk of photography. Of the squadron's three remaining aircraft, one is held in immediate reserve and the other two are employed on the transportation flying required by detachments, and they are also capable of carrying out photography. It will be seen that a good deal is expected of this squadron.

Many different types of aircraft have been employed on photography during the seventeen years of these operations. They have been varied to meet the constant improvements made in equipment and methods, and to suit the widely differing conditions of country in which they have to operate; also, in late years, they have to conform with the policy that aircraft for this work must be readily convertible for military service. As a result of these requirements the detachments are now equipped with the Northrop Delta—a single-engined, all-metal, low-wing monoplane which is quickly convertible for use on floats, wheels or skis and is built to accommodate bomb racks and machine guns. It can carry about 1300 lbs. pay load, cruises at about 170 miles per hour, and has a range of nearly 1200 miles. One detachment is still equipped with Bellancas—an older type of single-engined, fabric-covered, high-wing monoplane; but these will shortly be replaced by the newer aircraft. Canadian built as these are, they meet the many conditions peculiar to flying in Canada. Being readily convertible to floats, wheels and skis, they can operate efficiently on the aerodromes which exist throughout the settled areas, or on the open western prairies, on the coastal waters, or on the myriad of inland lakes and rivers which are scattered over the greater part of the Dominion, particularly in the North. Changes from floats to wheels or skis are made as the detach-

ments move about the country or as the climate changes the bare surfaces or water areas to snow and ice. The wide range of performance required of these aircraft will be appreciated when the scope of their operations is considered.

The operational area extends from the Atlantic to the Pacific, and from the southern tip of Canada to the far reaches of the Arctic. The areas to be photographed may be large or small, close to or distant from the home base, in settled country or unexplored regions far from the regular routes of travel. Operations may be required anywhere between sea level and 20,000 feet altitude; for much photography is being done over the Rocky Mountains. In addition, throughout operations a wide range of temperature is encountered, varying from extreme summer heat of about 110° F. to extreme winter cold of about −65° F. For example, one detachment on winter operations in the western Arctic was unable to record the temperature by their strut thermometers for three weeks because these thermometers were not calibrated below −30° C. It is surprising, however, how few people realize that the Arctic regions of Canada, as far North as 70° latitude, are not only ice-free during summer but experience weather as hot as southern Canada. Perhaps the best conception of the extent of photographic operations is obtainable from the fact that yearly each detachment proceeds from one operation to another, the more distant involving anything up to 3000 miles flying from the Squadron base, and that one detachment completes as much as 17,000 square miles of photography in the season.

Operations of such vast extent imply, of course, a large volume of work; this is facilitated by employing special photographic apparatus and methods. The Fairchild air camera at present in use has a fine and intricate mechanism which it is difficult to describe briefly. It has a "between the lens shutter," is electrically or hand operated and uses a film containing 115 exposures, each seven by nine inches. The film is loaded into magazines before flight and, as a number of magazines are carried and are interchangeable, the aircraft is capable of continuous photography for several hours; in fact, many photographic flights have occupied seven hours' flying. Either vertical or oblique photography is employed. The vertical method entails sighting one camera vertically to the ground, whereas in the oblique method three cameras are mounted facing rearward in the aircraft and are sighted obliquely to the ground, thus producing a fan of three oblique photographs. The three obliques are taken simultaneously, the two side photographs overlapping the centre one, and each showing the horizon. Compared with verticals, the oblique photographs cover a much greater ground area, but their background becomes too indistinct for accurate plotting. By oblique

As a result, a new and accurate map of Canada is taking shape. But it is not only for mapping of these remote areas that air photography is being utilized; there are many other purposes for which it is now considered essential: agricultural development, the timber industry, game preservation, fisheries, the mining industry in particular, and indeed most activities associated with the exploitation of Canada's natural resources. All these claims resulted in air photography becoming an increasingly important part of R.C.A.F. work since 1921. This culminated in 1931, when the greatest activity occurred, there being thirty aircraft employed on photographic operations. In recent years economy has somewhat curtailed these efforts, and now one squadron, comprising twelve aircraft, is allocated to this work. This is No. 8 (General Purpose) Squadron, with Headquarters at R.C.A.F. Station, Ottawa. It provides five mobile photographic detachments which operate as required anywhere in the Dominion. Four of these detachments consist of two aircraft each, while the fifth detachment comprises one only, and it is these nine aircraft which now carry out the bulk of photography. Of the squadron's three remaining aircraft, one is held in immediate reserve and the other two are employed on the transportation flying required by detachments, and they are also capable of carrying out photography. It will be seen that a good deal is expected of this squadron.

Many different types of aircraft have been employed on photography during the seventeen years of these operations. They have been varied to meet the constant improvements made in equipment and methods, and to suit the widely differing conditions of country in which they have to operate; also, in late years, they have to conform with the policy that aircraft for this work must be readily convertible for military service. As a result of these requirements the detachments are now equipped with the Northrop Delta—a single-engined, all-metal, low-wing monoplane which is quickly convertible for use on floats, wheels or skis and is built to accommodate bomb racks and machine guns. It can carry about 1300 lbs. pay load, cruises at about 170 miles per hour, and has a range of nearly 1200 miles. One detachment is still equipped with Bellancas—an older type of single-engined, fabric-covered, high-wing monoplane; but these will shortly be replaced by the newer aircraft. Canadian built as these are, they meet the many conditions peculiar to flying in Canada. Being readily convertible to floats, wheels and skis, they can operate efficiently on the aerodromes which exist throughout the settled areas, or on the open western prairies, on the coastal waters, or on the myriad of inland lakes and rivers which are scattered over the greater part of the Dominion, particularly in the North. Changes from floats to wheels or skis are made as the detach-

ments move about the country or as the climate changes the bare surfaces or water areas to snow and ice. The wide range of performance required of these aircraft will be appreciated when the scope of their operations is considered.

The operational area extends from the Atlantic to the Pacific, and from the southern tip of Canada to the far reaches of the Arctic. The areas to be photographed may be large or small, close to or distant from the home base, in settled country or unexplored regions far from the regular routes of travel. Operations may be required anywhere between sea level and 20,000 feet altitude; for much photography is being done over the Rocky Mountains. In addition, throughout operations a wide range of temperature is encountered, varying from extreme summer heat of about 110° F. to extreme winter cold of about −65° F. For example, one detachment on winter operations in the western Arctic was unable to record the temperature by their strut thermometers for three weeks because these thermometers were not calibrated below −30° C. It is surprising, however, how few people realize that the Arctic regions of Canada, as far North as 70° latitude, are not only ice-free during summer but experience weather as hot as southern Canada. Perhaps the best conception of the extent of photographic operations is obtainable from the fact that yearly each detachment proceeds from one operation to another, the more distant involving anything up to 3000 miles flying from the Squadron base, and that one detachment completes as much as 17,000 square miles of photography in the season.

Operations of such vast extent imply, of course, a large volume of work; this is facilitated by employing special photographic apparatus and methods. The Fairchild air camera at present in use has a fine and intricate mechanism which it is difficult to describe briefly. It has a "between the lens shutter," is electrically or hand operated and uses a film containing 115 exposures, each seven by nine inches. The film is loaded into magazines before flight and, as a number of magazines are carried and are interchangeable, the aircraft is capable of continuous photography for several hours; in fact, many photographic flights have occupied seven hours' flying. Either vertical or oblique photography is employed. The vertical method entails sighting one camera vertically to the ground, whereas in the oblique method three cameras are mounted facing rearward in the aircraft and are sighted obliquely to the ground, thus producing a fan of three oblique photographs. The three obliques are taken simultaneously, the two side photographs overlapping the centre one, and each showing the horizon. Compared with verticals, the oblique photographs cover a much greater ground area, but their background becomes too indistinct for accurate plotting. By oblique

photography, therefore, it is possible to map an area in much shorter time than by vertical photography, but where maximum ground detail is all-important, verticals are preferable.

These two methods of mapping require somewhat different flying methods. In oblique photography the area is covered with parallel flight lines six to eight miles apart, depending on the flying altitude, which is usually between 5000 and 8000 feet. Every three miles along these flight lines a set of three oblique photographs is taken which cover about fifteen square miles of foreground useful for mapping. In vertical photography the distance between parallel flight lines is also dependent on the flying altitude, which may be anything between 5000 and 20,000 feet. For example, at 10,000 feet the lines are generally flown a mile apart, each exposure covering about three square miles. In both oblique and vertical photography, forward and side overlap of adjoining photographs are essential for plotting and for stereoscopic examination of prints.

Films are not developed or printed by detachments, but are despatched as soon as possible after exposure to the R.C.A.F. Photographic Establishment at Ottawa. From here the mapping photographs go to the Government department responsible for map making.

Although photographic aircraft are equipped with automatic pilots, and cameras are electrically operated, it is wrong to think that little effort is required of the crew. Apart from the fact that high flying imposes a considerable strain on personnel, a photographic flight is a period of continuous and intense concentration for both pilot and camera operator. Precision is essential. The pilot must navigate the aircraft straight along the flight lines worked out on his map, and these lines may be anything up to 120 miles in length. He must determine and allow for drift, for slight deviations from line cause gaps in the photography. He must maintain fore and aft and lateral level in addition to constant altitude and air speed. The camera operator, for his part, must determine the ground speed, calculate the interval between exposures and set the electrical timing apparatus accordingly, change magazines, and adjust the camera for drift. He records the temperature inside and outside the cabin, the time and the altitude for every set of exposures, together with location data relevant to each film. In addition, the entire operation of the cameras and electrical apparatus must be checked throughout the flight. These many duties clearly necessitate a high standard of proficiency and extensive training for the photographic crew before commencement of operations.

As with any expedition into isolated areas, the success or failure of these operations depends greatly on adequate and timely preparation.

Fuel, food, and equipment are considered carefully, and it is sometimes necessary to arrange for petrol and oil supplies a year in advance. Supplies are transported by rail, boat, canoe and possibly horse or dog team to the proposed temporary operating base, or as close thereto as possible. But where ground transportation becomes too difficult or is too slow everything is carried by air. For very isolated operations, where extensive transportation flying by the two detachment aircraft interferes with actual photography, a transportation aircraft is allotted to the detachment to maintain its supply.

This problem of supply is a big one, for the major items carried with the detachment include camera and wireless equipment, photographic film, engine and aircraft spares, camp equipment, food, and personal necessities. The quantities are considerable, and great care is taken to keep all supplies and equipment to an absolute minimum in order that air transportation be made as easy as possible.

As with supplies and equipment, personnel must also be kept to a minimum. Two pilots and three mechanics, the latter trained as camera operators, are the minimum personnel comprising a detachment. The senior pilot is in charge, and on him falls the responsibility of the efficient working of the unit. A cook and an additional mechanic are often included in the detachment, and a Government surveyor is sometimes attached to it during operations. To the extreme disgust of the rest of the personnel, it is always the cook who is left behind when the problem of transportation becomes acute. The absence of a cook necessitates someone taking on this usually unpopular job. This is often decided by the toss of a coin or is taken in turn ; but sometimes a reluctant volunteer for cook's duty presents himself in self-defence, rather than again subject his stomach to the doubtful concoctions prepared by his mates. Usually, however, the detachment commander contrives to take the cook along, and messing is a joy, for to its excellent rations the detachment adds the fish and game which abound throughout most of the northern lake country.

In order to accomplish the maximum work during the open-water season, the detachments follow the retreating ice in the Spring and retire before its advance in the Autumn. Early Spring operations commence as soon as lakes and rivers are ice free, and naturally this occurs in southern parts first, operations being pushed northward as the ice disappears. Not until early July can aircraft operate in the western Arctic, and the retreat southward commences early in September when the ice again appears on the small lakes. To compensate for this short operating season in the Arctic, however, this land of the midnight sun provides long hours of daylight in which to work.

Establishing camp soon becomes a matter of routine. A suitable base is selected on some lake convenient to the area to be photographed, and camp is made; wireless masts are erected and small silk tents pitched to serve as sleeping quarters, wireless office, cookhouse, photographic workshop and storehouse. The small portable petrol stove is erected in the cook tent; possibly a small cave is dug in which to store the rolls of photographic film to keep them cool; the food supplies are stored away and the detachment settles down for a short or protracted stay. Those who have been obliged to sleep for long periods in a bedroll on the ground, with only a waterproof ground sheet for a mattress, will understand the uneasiness of the first few nights. A few balsam or spruce boughs go far to soften a bed on the ground, however, and discomfort gradually gives way to satisfaction. But discomfort is hard to dispel during the fly season, and only those who have lived in the Canadian bush or barren lands can appreciate the trials of the personnel caused by the scourge of black flies, mosquitoes, bulldog flies and countless other biting and stinging insects. These pests make ground work almost intolerable at times, and the shelter of the tents with their mosquito netting becomes a welcome refuge. Being unmolested while doing their flying, however, the aircraft crews are more fortunate than the detachment surveyor, who must carry out his main task on the ground amidst the insects.

This surveyor leads a lonely existence during operations. His duty is to establish ground control points throughout the photographic area. This he does by determining by astronomical observations the exact geographical position of a number of ground features which can be recognized in the air photographs, and on these points the survey is based. He is flown to each observation point with his tent, food, survey instruments and wireless set, and left alone to obtain his celestial observations, which, depending on the weather, may take several days. When ready to move, he informs the detachment by wireless, and the aircraft returns and flies him to his next position, where again he is left to his lonely duty.

The weather usually decides the length of the photographic operation. For photography a clear sky is required, or one not too heavily overcast and with clouds above the altitude at which the aircraft must fly. Cloud, hazy atmosphere, smoke, fog and mist are among the air photographer's list of bad friends and, of course, photography must be limited to those hours which provide sufficiently strong sunlight. Often the operation must be discontinued owing to the approach of freeze-up. To be caught by an early freeze-up, perhaps hundreds of miles from the nearest settlement and even farther from your base, is not a pleasant

prospect, and many are the anxious days spent just prior to the freeze-up by the detachment in a last-minute effort to complete a job. Final departures are sometimes made from lakes already circled by a rim of ice along the shore, with the flying spray freezing on the floats and struts of the aircraft as they take off and head for more southerly areas. These are anxious moments for the pilot, when his thoughts flash to the long cold winter at hand. Although each aircraft carries a gun or rifle, fishing tackle and iron rations sufficient for a few weeks' emergency, a prolonged wait over freeze-up for rescue aircraft is a grim prospect.

Equally unpleasant is the prospect of becoming lost in the wilderness, and, as photographic operations are largely over unmapped areas, navigation is therefore of prime importance. Navigational proficiency is particularly essential in the barren lands of the far North, because the proximity of the North Magnetic Pole intensifies difficulties by reducing the directive strength of the magnetic compass and by giving rise to large magnetic variations which change rapidly within short distances. During all the years of photographic operations serious trouble has been averted, however, with one notable exception. On this occasion a transportation aircraft with a crew of two became lost in the barren lands of the North-West Territories to the East of Great Bear Lake, after delivering an engine to a disabled photographic aircraft. This necessitated an intensive search by aircraft which extended over 68,000 square miles of territory before being successfully concluded on the thirtieth day, and the disaster of being caught by freeze-up was escaped by only one day. The situation was aggravated by the fact that the intensive flying of the searching aircraft exhausted the fuel supplies which had been provided for the photographic operation, and additional fuel had to be flown several hundred miles. This search and the experiences of the lost crew, whilst subsisting on their meagre emergency rations, are now interesting Service history, but the lessons learned therefrom have been carefully observed. Since then all detachment aircraft have been equipped with transmitting and receiving wireless sets, and a similar set is located at each detachment base. These wireless sets, which have a reliable range of 400 to 500 miles, are not only used for emergency, but provide regular intercommunication between individual aircraft, between aircraft and the detachment base, and also with the Government wireless stations which dot the north country. As the personnel are now trained to determine their geographical position by astronomical observation, the wireless sets enable a lost aircraft to pick up wireless time signals which are necessary for the astronomical calculations.

Despite a good measure of hard work and hardship the detachment

personnel have their fair share of fun. They must hold themselves in constant readiness to fly when the weather appears favourable for photography, but between the stretches of favourable weather there are intervals which leave them free to hunt, fish, swim and explore the country, as well as to play games amongst themselves. It is with mixed feelings of reluctance and satisfaction, therefore, that the detachment heads for home at the end of the season.

From this account of the activities of a photographic detachment and description of air photographic operations in Canada it may be possible to form some conception of the important part being played by the Royal Canadian Air Force in the mapping of Canada. One fact which, it is hoped, emerges clearly is that these operations provide a wealth of practical experience which the Service personnel would not otherwise obtain. This experience breeds initiative, resourcefulness and reliability and thus contributes very definitely to the general efficiency of the Service.

THE PREPARATION OF TACTICAL EXERCISES WITHOUT TROOPS

By LIEUT.-COLONEL W. E. MAITLAND-DOUGALL, D.S.O., M.C., *p.s.c.*, Royal Artillery.

NOW that the Great War is receding into the dim past, there are comparatively few persons left in the Army who have any first-hand experience of war. One of the effects of this is to increase the importance of the military function that goes by the name of "Tactical Exercise without Troops," or more shortly "the T.E.W.T."

Always valuable, they are now of supreme importance, for they are the chief means of teaching future leaders the art of war; yet the standard of authorship is not high. We appreciate that there are principles of war which should not ordinarily be broken. We are less quick to realize that there are also principles to be observed in preparing T.E.W.Ts, and these, it must be admitted, are continually being broken.

For example, it is useless for a T.E.W.T. simply to teach people what they know already. Yet this is often done. At the end of a good T.E.W.T., the beliefs of the majority who attend it should have undergone some change; otherwise the T.E.W.T. has either been unconvincing, or it has dealt with a useless subject. In either case nothing has been achieved and time has been wasted. It is fruitless to prepare a problem to which all students will return the answer "attack," if attack is in your view the only proper solution; for your problem has not changed their opinion in any way from what it was before. The problem might, however, be a useful one, if after they had answered "attack," you were able to convince them that an attack would cost more lives and would take longer than an outflanking movement. If in the circumstances presented this was sound teaching and your arguments carried conviction, then your problem has had some effect—it has changed or modified the opinion of a number of young men.

Again it is no uncommon thing to see a T.E.W.T. set to test some theory, to see "how it will work out in practice." This of course is nonsense, for to test a theory one at least needs plenty of soldiers on the ground, and everything as nearly as possible at war strength. No, the object of the T.E.W.T. is to give instruction, and the director, moreover, must be perfectly clear about what he means to teach. If he does not know himself what he means to teach, how can he teach others?

Sometimes, however, a Micawber-like attitude is adopted, and the director waits to see what points of interest will turn up. This is a reasonable attitude in an exercise with troops, where both sides are fully represented and one is trying to derive lessons from realistic conditions. But in a T.E.W.T., the director is omnipotent, and if he does not design each problem to bring out a lesson, he is throwing away his opportunities. T.E.W.Ts are not like oyster beds to be searched for pearls of wisdom.

Inspiration should be obtained from real war, for that is the only place where morale and all those other psychological conditions exert their proper influence; China and Spain are the places now from which inspiration should be sought. A little value may be obtained from peace-time manœuvres and exercises with troops, for though fear and morale are missing, one has at least some of the ingredients of real war—fatigue, discomfort and uncertainty. But in the T.E.W.T. itself, realistic conditions are absent, and the T.E.W.T. therefore is not the place to turn for inspiration. The purpose of the T.E.W.T. is to give instruction—to present a picture and a problem; and to suggest that the obvious response would be unwise and that it would be better to do something else.

Common Faults

But to return to the principles of the T.E.W.T. Another common mistake is to have too many "generations" at a T.E.W.T., that is to say, to have both senior and junior officers together. Apart from the possibility that a senior officer may show to disadvantage before his juniors, there is the fact that attention cannot be focussed simultaneously on the work of both high and low. Sometimes there is a temptation to include several generations "to see how things will work out," but as has already been pointed out, the T.E.W.T. is not the place for this. What really happens when both senior and junior officers are present, is that they work by turns. First the juniors are unemployed while the seniors argue questions of policy; then when their policy is declared, the seniors must sit idle while the underlings thrash out the details. Thus seniors and juniors are idle by turns and this pleases no one, for when people come to a T.E.W.T. they want to be busy; or anyhow, being away from home, they have little else to do, so they want to fit the work into as few days as possible and this amounts to much the same thing.

Other common faults are complicating the issue and the production of too much paper. For example, it is not unusual at a T.E.W.T., after carefully marking the enemy's exact dispositions on one's map, to find that since then he has been driven back to another position, which is the one he really does occupy for Problem No. 1. There was, in fact, no

point in giving his previous position in detail at all. It has merely added to the paper and has fogged peoples' minds. However, there are worse faults to come. There is the unimaginative T.E.W.T. Everyone, alas, has met this type. In outline it is very correct; it is headed by a set of platitudinous lessons, each with one or two prim references to the regulations. But it fails; usually for several reasons. Generally it contains nothing fresh that is worth teaching or which is not known already. Probably too, it is guilty of the unpardonable sin of being boring, but with that we will deal later. In addition the subject is very likely quite unsuitable. Perhaps it is a battalion exercise, and the author, taking his cue from above, has headed it "To study the conversion of the 'break-in' into the 'break-through.'" But that is the affair of larger formations. Battalions attack and exploit and they perform plenty of other most interesting tasks, but this particular problem is almost meaningless as applied to them.

Constructive Criticism

But let us have done with destructive criticism. What exactly shall we say is the object of the T.E.W.T.? Firstly and lastly, it is instruction—that is to say to change men's minds in accordance with modern ideas, and for this purpose suitable subjects must be selected, and problems and answers must be presented in a style which is both refreshing and clear. It is better to risk criticism than to be guilty of vagueness, so we will suggest an example. Let us take as our text, the unwisdom of attack when outflanking can produce better and quicker results. When an advanced guard bumps into a hostile rearguard in position, should it attack, or should it march round the enemy's flank? The director has carefully considered this question; he knows that attack is accepted by the Army as a whole as the only possible answer to this situation—possibly a flank attack, but still an attack. He is certain that opinion is far too bigoted about this. He realizes that defence to-day is very strong indeed, except that it is most sensitive about being outflanked. So there is another solution, simply to march round, and, if the enemy does not clear out, to surround him.

The director believes that by means of a well-staged exercise he will be able to change the general outlook about this, to show that there is at least one other possible course, to discourage that fatal habit of always acting by rule of thumb, and, last but not least, to pour cold water on those who seem always willing, whatever the conditions, to commit infantry to the attack. The director, in fact, starts by knowing exactly what he means to teach; he is not staging the exercise to help himself to make up his mind.

He selects suitable ground. All he needs is two parallel roads, some two or more miles apart, with a small ridge cutting across one of these roads. The opening narrative paints the picture of our leading troops held up by an enemy rearguard in position on the ridge—a position incidentally that is sufficiently strong to necessitate the deployment of a considerable amount of artillery against it. The first stand is on the ridge and is conducted from the enemy's point of view. The rearguard commander, who commands an infantry brigade, has been instructed to cause as much delay as he can and has been asked how long he can promise to hold on before having to withdraw. He has been told that his particular opponent has very few tanks, but is a firm believer in attacking. He therefore reasons things out in this way: "My position is strong enough to resist the vanguard attack which incidentally it will take at least an hour to launch. After that will come a main guard attack, but as I am equally strong in infantry and machine guns, I am not afraid of that either, unless it is supported by all the artillery of the division. In actual war, an attack supported by the whole divisional artillery cannot be staged in less than eight hours (this figure has been quoted in a W.O. Training Memorandum). This means that I am safe for nine hours altogether, but to be very much on the safe side, I will only promise to hold on for six hours."

The scene now shifts to the other side. Stand No. 2 is situated in the lines of the Advanced Guard and discloses the Advanced Guard Commander considering his problem; he is a youngish man with an open mind. The general who was so addicted to frontal attack unfortunately sat down upon a piece of barbed wire that was well splashed with mustard gas. The new man, not being wedded to a policy of attack, considers whether he could not more quickly dislodge the enemy by outflanking. Though relatively young he has been in two big retreats himself—the Retreat from Mons and the Retreat of March, 1918—and he remembers that rearguards are seldom alarmed about their front (or should it be rear?) but only about their flanks. He knows from experience that it is the fear of being outflanked and cut off that preys on one's mind and makes one "jumpy." Moreover, outflanking action will save those terrible casualties, that even well-arranged, well-supported attacks are so liable to incur. He also realizes that if the hostile rearguard is deceived into waiting too long there is a possibility of cutting them off and taking a lot of prisoners. So he orders all his artillery into action to deceive the enemy into thinking he means to attack and simultaneously he starts to march round. For his calculations suggest that if the enemy has not cleared out in three hours time they will be in very grave danger of being surrounded.

Stand No. 3 can deal with the troops that are marching round,

showing their action, and how, when eventually they meet opposition, they seek always to go round, rather than to pause and attack; for a pause means waste of time, and attack means waste of life. It is far better to advance without waste of either.

Further stands can deal with the detailed action of any particular branch of the Service that is strongly represented at the T.E.W.T. There are many possible subjects—how the cavalry would act in locating the enemy's flanks or in dealing with opposing cavalry; what would be the action of artillery actually accompanying the outflanking force; how the outflanking force itself would act if attacked; how communication would be maintained, etc., etc. Lastly the director wants a point for his final conference, for his summing up: could the outflanking manœuvre in the exercise have been improved on? Yes, it could. Suppose the advanced guard had noted by aeroplane which road the enemy were using and had itself purposely marched on the other road. Or suppose even that it had decided from the beginning to advance on both roads? In either of these cases the outflanking would have been automatic and would have begun to take effect earlier.

It is suggested then that a satisfactory T.E.W.T. could be built on the above framework. But it is one thing to suggest a single good T.E.W.T. and quite another to raise the standard of T.E.W.Ts generally; yet this is the real problem. It is not easy to change people's minds, and one will not carry conviction, even though one's views are correct, unless each problem is really well prepared and well presented.

Unfortunately there is little to-day to prevent an unconvincing or dull T.E.W.T. being staged. We see few really bad plays because there is money in that and the man who stages a bad play is going to lose money. But the T.E.W.T. is not commercialized, and if the headquarter staff concerned with preparing a T.E.W.T. happen to be busy during the few weeks preceding it, it is very probable that dull unimaginative instruction will be given; and this, even if it be on sound lines, will carry little conviction. If a bad play is put on, few people will attend, and few therefore will be bored. But unfortunately, with the T.E.W.T. where owing to lack of monetary interest there is greater danger of inferiority, attendance is compulsory. The audience are bound to be bored; their thirst for knowledge must be diminished. And the general popularity of T.E.W.Ts suffers a serious setback.

A Special Staff

It would be an interesting experiment to make T.E.W.Ts voluntary. This would probably shame the authors of bad T.E.W.Ts into taking greater pains, but this raises a fresh question: can a bad author even by

taking pains, write a good T.E.W.T. ? After all, the writing of books and plays is a specialist business ; but in the Army we leave the writing of T.E.W.Ts to the ordinary staff officer, and the ordinary staff officer may have no flair for this at all. Might it not be wise to have a special staff for the preparation of T.E.W.Ts ? Could not they, in consultation with the General Staff, decide on the principal lessons which should be taught, drawing inspiration from the happenings in China and Spain ? And having done so, could not they prepare suitable T.E.W.Ts in England to provide instruction for large numbers of officers of all arms ? It may be said that a small staff could not set T.E.W.Ts in the immediate neighbourhood of all the garrison towns in England. But why a small staff, and why in the immediate vicinity of garrison towns ? It is usual, anyhow, for the authors of T.E.W.Ts to go some distance to avoid ground that is too well known.

In any case T.E.W.Ts divide naturally into two kinds : the bigger type, with perhaps some historical setting, which fit a particular piece of ground ; these, it is true, are local in character, but they would only be used by the larger formations. The other type of T.E.W.T. and by far the commonest, is the small one, suitable for units or small formations. These can be issued like ready-made clothes, and fitted afterwards to the ground. A case in point is the T.E.W.T. which we have already considered in detail. All we looked for there, it will be remembered, was two parallel roads with a ridge cutting across one of the roads. That, in fact, was a T.E.W.T. for which suitable ground could be found almost anywhere.

It does not seem likely then that a special staff would have such a very difficult task. But even if they did produce less than we expect, they would at least provide a number of T.E.W.Ts which would act as models to raise the general standard throughout the Army. But there is still more in it than this. There are great openings for the cinema in the manufacture of T.E.W.Ts. It can show the development of an attack diagrammatically or as really seen from the air. It can pause and show either a map or a view from an O.P. while students or syndicates consider a problem. It can reproduce indoors on wet days, or after dark, all the pictures that are necessary to present a military problem ; and it can thereby afford instruction to the Territorial Army at night. There is a vast field to be explored, but it is a task for specialists. What is worth doing is worth doing well. One cannot carry conviction and high-class instruction to the rank and file of the army using second-rate vehicles. Let us have these vehicles well built, constructed by experts in the same way as in civil life where playwrights alone write plays.

THE SIMPLIFICATION AND REDUCTION OF REGIMENTAL PAPER WORK

By MAJOR R. R. DAUBAN, *p.s.c.*, Royal Artillery.

MANY regimental officers believe that it is administrative and paper work created or at least controlled by the Staffs and Administrative Corps which is hampering the efficiency of the fighting troops to-day. This view has been crystallized in a recent article by Lieutenant M. P. Huthwaite, the Loyal Regiment, in another Service publication.[1] He is probably not alone, too, in assuming that these authorities are primarily responsible for this burden. But the truth is that the prevailing paper work in the Army is the result of a complicated system which has got beyond the control of any one category of officer or department, and the staff and administrative services are just as much sufferers of the system as is the regimental officer.

Lieutenant Huthwaite writes that " Company Commanders and Subalterns spend a very large proportion of their time in administrative work which is largely unnecessary." But surely that depends from whose point of view it is unnecessary: what may appear superfluous to a Company Commander may be of considerable importance to the Director of Contracts, for instance. The author then proceeds to examine " the obstacles which exist " in the battalion, but as his examination is entirely from the battalion point of view, his suggested remedies are in consequence too limited in scope.

Although this article will refer more specifically to conditions in India where I am serving at present, I have no doubt somewhat similar conditions exist at home, otherwise Lieutenant Huthwaite would not have written what he has. No treatment can be effective if the cause of the disease is not correctly diagnosed, I shall therefore attempt to trace the reasons for the present conditions in the Army and to suggest remedial measures.

It is necessary at the outset to state that what may be termed the regimental officers' " load " consists of two closely inter-related but nevertheless quite distinct and separate loads : the " training load " and the " administrative load."

[1] Strangulation of Efficiency," published in *The Fighting Forces* for June, 1938, p. 146.

Fifty years ago life in the Army was, from all accounts, pleasant and simple compared with to-day. A Commanding Officer was an autocrat with real powers. He relied on his own initiative; he was largely independent, and was fully responsible for the fighting efficiency of his unit. Administration was of minor importance, and subject to only very general control from superior authority. Fighting efficiency was the primary and almost the sole concern of commanders, and how simple this was in those days for the battalion commander!

The infantry was the queen of the battlefield; the rifle and the bayonet were its main weapons; infantry tactics—which was all that mattered to the infantryman—were wonderfully simple, co-operation with other arms was known as a theory, but was mostly absent in practice even as late as 1914. Officers and men were taught how to fight, and administration looked after itself somehow or other.

The training load was considered sufficient in itself, the administrative load was a very light one affecting only a few. Life in the Army, and out of it, was dignified pleasant and leisurely. Yet even in those days a Commanding officer had an Adjutant and a Quartermaster to help him.

Modern Developments

What is the picture to-day? Multiplicity of weapons; complicated and constantly changing tactical doctrines; co-operation not between two but between as many as six different arms now the essence of success on the battlefield; speed, mobility and still greater speed in all phases of warfare; a confusing variety of mechanical vehicles; and over it all the ghost of chemical warfare. These constitute the training load to-day. Surely a sufficient burden in itself for any Commanding officer!

The administrative load in war consists of: ammunition supply; the enormous and endless variety of equipment and material now essential; food and clothes for men and animals; fuel for machines; treatment and evacuation of sick and wounded; hygiene and sanitation; salvage; pay; field canteens, detailed records of everything; and lastly the complications of chemical warfare. As if these were not sufficient we must superimpose on them the requirements of administration in times of peace; these requirements are in terms of detailed financial and administrative control at every stage and in every particular.

Yet to carry these enormous loads we still find only a Commanding Officer, his Adjutant and a Quartermaster. The load has increased a thousand times, but the organization in the battalion has remained very

much the same. The training load of to-day is the result of scientific progress, of modern developments; it cannot be reduced; it is likely to increase in complexity and scope.

What of the administrative load, can it be reduced, and how has it grown to its present size? Its growth is partly the result of developments and increase of the fighting weapons and tactics, partly due to the advance of civilization and modern standards, and partly the result of the Great War and the subsequent period.

Over-centralized Control

During the Great War the Nation and the Army realized the power and importance of centralized and organized control. Every national and military activity became organized and subject to strict control. This was essential in order to obtain the maximum output of effort from the nation. The War was followed by nearly twenty years of financial starvation so far as the fighting forces in general and the Army in particular were concerned. This lean period resulted in greater and closer control of all Army activities in order to obtain the utmost from every farthing of the Army budget. Everything became a question of money, and in consequence, financial control became supreme and absolute, and remains so to-day—in India at any rate. Absolute financial control implies detailed and accurate data, numerous and detailed regulations, and lastly, detailed check and counter-check at every stage. Thus of itself financial control is responsible for a tremendous volume of paper work.

During this period of lean years, and of closer and closer control, administration became of primary importance to any regimental commander because it was so readily checked, whilst fighting efficiency became more and more of secondary importance, first because it could not be checked and assessed with the same ease and accuracy, and secondly because something had to be given up to make time for the increasing demands of administration. We can therefore conclude that the basic causes of the present burden of administration and paper work are :—

(1) Complete and absolute centralized control.
(2) The enormously complicated and complex machine which the Army is to-day.

The fact that the modern Army is a very complicated and complex machine makes it an exceedingly costly one, and so long as we retain a democratic constitution and government we must expect a considerable degree of financial control. It remains, however, for the Army to balance the claims of administrative control with those of fighting

efficiency, and to devise an organization and a system which will ensure both fighting efficiency and economical and efficient administration.

Suggested Remedies

Basic cause (2) is inevitable and not very susceptible to treatment. The Army will continue to be a complicated fighting machine, and thus the training load will continue to be a heavy one, which makes it all the more necessary to lighten the administrative load.

Basic cause (1) is unquestionably susceptible to treatment, and must, in fact, be drastically dealt with if fighting efficiency in a unit is to be achieved.

The suggested remedial measures are :—

A. Decentralization of control to the fullest extent possible.

B. Increased powers for every commander down to and including commanders of companies and equivalent units.

C. Decentralization of administrative and financial responsibility in units.

D. Provision in units of " Specialists " to assist the Commanding Officer.

E. Provision of an organization in units more in keeping with modern standards and modern demands.

We will now examine in greater detail these suggested measures: A. and B. should be tackled by a committee of senior staff officers and regimental commanders. The existing control is excessively centralized and results in a mass of correspondence ; many unimportant decisions have to be referred to the highest " Superior Authority."

The existing powers, financial, administrative and legal, of Commanding Officers and of Brigadiers, are quite absurd. Officers of such service and rank should be trusted with considerably greater powers. In addition, the powers granted should as far as possible be absolute within their respective limits. At present the little power which exists is so hedged in by restrictions as to be largely nullified. By absolute powers I mean that a commander should be allowed complete liberty of action in his discretion in every case, subject to certain limits. For instance, a Commanding Officer might be given financial powers up to £20, and should be permitted to write off or strike off up to that value in his sole discretion on the merits of every individual case and without regard to any specific regulations or restrictions, *except* in cases where disciplinary action is indicated. Similarly if a Commanding Officer is given legal powers up to two months detention—which I suggest is perfectly reasonable—this power should be without right of trial by

Court Martial up to one month's detention, and without right of appeal in all cases dealt with by the Commanding Officer.

Company commanders might be given financial powers up to £5 and legal powers up to fourteen days detention without right of appeal.

Brigadiers might be given financial powers up to £100, and legal powers up to four months detention, the first three months being without right of appeal and without right of claiming trial by Court Martial. Consider the tremendous saving in time and correspondence which would result from such increased powers. The number of Court Martials would be reduced by half, and the correspondence by a third at least. The amounts " written off " would probably be higher than at present, but the percentage compared to the total Army budget would still remain insignificant.

Business firms deal in percentages ; managers are given financial powers in terms of percentages of their output or sale or whatever it is they control ; so why should not the Army adopt the same principle. If a limit to the financial powers of any commander is required beyond an individual limit, I would suggest an annual maximum *not* to be exceeded in any one financial year. For instance, if a Commanding Officer's powers were £20 for any individual case, he could be limited to a maximum of say £300 in any one financial year.

Simplification of Regulations

As a corollary to increased powers, our existing regulations must be drastically revised and reduced in number. They should deal with principles and not attempt to cover every possible contingency. They should guide and assist officers in managing the Army instead of attempting, as at present, to do all the managing and to impose all manner of restrictions without compensating advantages. Their very detailed nature and their vast number make it impossible for anyone ever to know them, and insufficient knowledge of regulations and of the correct procedure is responsible for a very large proportion of correspondence to and from units. Regimental clerks, and regimental officers especially, simply cannot compete with such intricate and innumerable regulations, with the result that the wrong action is taken and avoidable correspondence is the result. This, neither the Staff nor the Administrative Services can avoid, they also are obliged to comply with regulations, and they have the additional duty of seeing that units likewise comply.

The granting of increased powers and the drastic revision of our regulations on the lines suggested above would be of inestimable benefit to the Army.

Such powers and such procedure would :—

(*a*) Give real authority to commanders.

(*b*) Give officers opportunities to cultivate initiative and independent judgment.

(*c*) Dispense with a tremendous amount of paper work now inevitable even in the simplest of cases.

(*d*) Dispose quickly, efficiently, and satisfactorily of the many minor points which arise every week and which under existing conditions are immediately referred to higher authority.

(*e*) Last but not least, dispense with the services, in India, of hundreds of Indian clerks of the Accountants and Audit's staff whose sole purpose is to check and counter-check whether all regulations have been complied with.

This reduction of establishment would in itself probably pay for the grant of increased powers and decentralization of control.

Decentralization of Responsibility

As regards measure C.—decentralization of responsibility in units : under existing regulations and conditions, the Commanding Officer of a battalion is held solely and entirely responsible for everything which happens in his battalion. He is given a Quartermaster, but as this latter is not allowed any responsibility, the Commanding Officer remains responsible. He is allowed a President, Regimental Institutes, but again the Commanding Officer remains responsible. It is the same in respect of company commanders. In other words, the Commanding Officer has under him some twenty-five officers and eight hundred men, but he remains responsible for the actions or inactions of every member of his unit. It is this centralization of responsibility which is responsible for the present excessive burden devolving on the Commanding Officer.

Under modern conditions of training and administration, it is unjust and not conducive to efficiency to expect one man to shoulder the entire responsibility for everything. His assistants and his company commanders must be given definite responsibilities of their own as well as definite powers. The Commanding Officer must remain responsible for the fighting efficiency and the discipline of his unit and also for the general welfare of his men, but he cannot carry in addition the detailed responsibility of every aspect of administration. As it is now, being entirely responsible he is naturally inclined to retain full control of everything, a procedure which absorbs too much of his time at the expense of " training," and which is detrimental to initiative and self-reliance on the part of his subordinates.

Measures D. and E. may with convenience be considered together. Even with greater decentralization of control, with increased powers, and with simplified regulations, the existing organization in an infantry battalion would be quite inadequate to carry efficiently the tremendous burden, which, let us not forget, consists of a training load and an administrative load.

The fighting portion of a battalion has been modernized and mechanized, thus to train and lead this portion is more arduous and difficult than it ever was. Along with this modernization, the administrative burden has increased a hundredfold for the simple reason, if for no other, that equipment and stores have increased in number and variety with every new weapon and new machine. Yet the organization in the battalion has remained what it was before the Great War.

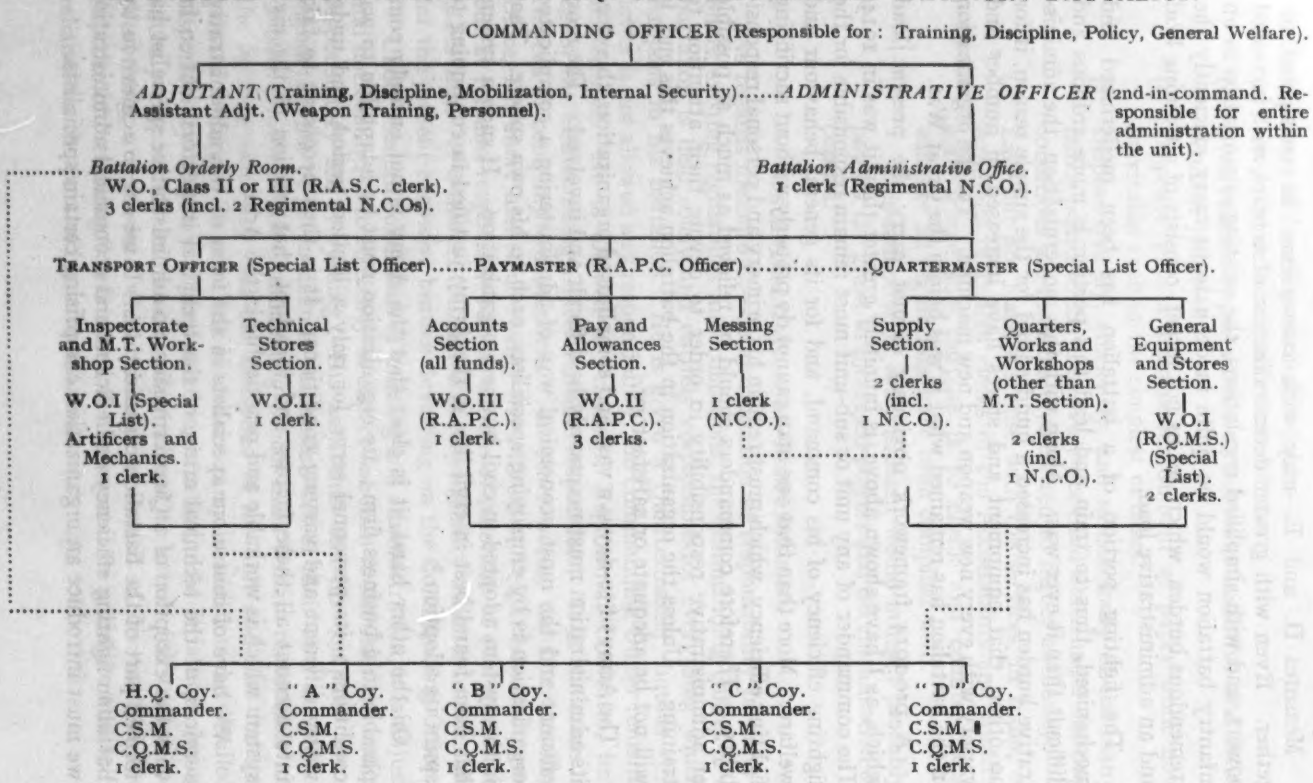
A pre-1914 framework obviously cannot carry the present load which, as I have shown above, is infinitely greater than it was in 1914. The commander of any unit or sub-unit must remain responsible for the fighting efficiency of his command, and for its general behaviour and welfare. More than that one man cannot do properly without sacrificing fighting efficiency, which must remain his primary and personal responsibility. Therefore commanders should be relieved as much as possible of administrative responsibility in order to devote their attention to training. Unless the organization in the battalion achieves this end, it will not be adequate or satisfactory.

The Army of to-day is a vast and complicated organization, therefore its administration must necessarily be difficult and involved. The most efficient and the most economical way of administering a complicated organization is by employing specialists, each to his own sphere. That is the system adopted in civil business organization. If such a system has been found best in civil life, is the Army justified in continuing to spurn its adoption ?

On the other hand, it is clear that the Army is not entirely comparable to a business firm ; its organization must be adaptable to war conditions ; its personnel serve for only a limited period, and under vastly different and varying conditions. It is thus necessary to take into account all these factors and to adopt that portion of the civil system which is workable and practicable in the Army.

We have of course our specialists in the form of the administrative services, of the technical arms, of the technical inspectors, but so far with the exception of a Quartermaster, no administrative specialist has formed part of the battalion organization. If we are to achieve in the battalion fighting efficiency *and* efficient and economical administration we must introduce an organization comprising certain specialists.

SUGGESTED ORGANIZATION FOR H.Q. OF A MECHANIZED INFANTRY BATTALION



NOTE.—Storemen are not included in this table.

Proposed Organization of Battalion Headquarters

A suggested organization for a battalion headquarters is shown in detail in the attached diagram. There remains only to explain its salient points.

(*a*) The Commanding Officer remains responsible for training, for all natures of instruction, for discipline, and for personnel; also, for policy and the general welfare of his command.

Apart from his company commanders he has two assistants, an administrative officer and an Adjutant.

(*b*) The Administrative Officer, who should normally be the second-in-command, is entirely responsible for the administration of the battalion. He must be given definite financial and administrative powers of his own; he must deal with all correspondence on administrative matters in his own name, the Commanding Officer signing only questions of policy. He is assisted by three specialists, the Quartermaster, the Transport Officer, and the Paymaster—through whom he conveys his orders to sub-units and to the several departments of the battalion.

(*c*) The Adjutant is relieved of all administrative duties; he is the Commanding Officer's right-hand man in matters of training, discipline and personnel. He must, therefore, be an officer with knowledge, experience and standing, and should be a senior Captain or junior Major. He is given an Assistant Adjutant, who can relieve him of the large amount of paper work involved under the general term "Personnel," as well as run the weapon training of the unit.

(*d*) The specialists responsible for the detailed administration in the battalion consist of three commissioned officers and five warrant officers (or staff sergeants). The Battalion Orderly Room is in charge of a specialist clerk who should be a member of the clerical section of the R.A.S.C., or who should have received special clerical training and qualified as a clerk. The administrative departments, three in number, are the Transport department, the Accounts department and the Quartermaster's department.

(*e*) The three specialists—the Quartermaster, the Transport officer and the Paymaster, must each be given definite financial and administrative responsibilities of their own. They must be empowered to correspond direct with equivalent units and with administrative services and establish-

ments on all questions of ordinary importance affecting their departments. All important questions, and all correspondence to higher formations would be dealt with by the administrative officer.

(*f*) The Quartermaster must, as at present, remain a "Special List" officer. The Transport Officer must also be a "Special List" officer. He is in fact a technical Quartermaster as well as a mechanical expert. He must be qualified to run the inspection, repair and maintenance of all mechanical vehicles in his unit.

(An entirely mechanized battalion is visualized.)

The Paymaster must be an officer of the Royal Army Pay Corps attached to a battalion for a certain period of duty.

(*g*) Each specialist officer has been given specialist Warrant Officers as assistants. These Warrant Officers would provide from amongst their ranks the candidates for commissioned ranks in their respective branches.

(*h*) A transport department is considered a necessity in a mechanized unit of the size of a battalion. It is an entirely new addition to the administrative organization of a battalion but it is the inevitable consequence of giving to the battalion a large number of varied mechanical vehicles. Obviously the existing Quartermaster's Branch cannot take on this additional and very technical responsibility.

(*i*) As regards the Accounts Department. Accountancy is a special subject for which the average regimental officer has neither the time nor the aptitude. If he makes the time it can only be at the expense of training.

A battalion of infantry employing some seven hundred men and controlling thousands of pounds sterling of equipment and several funds should be provided with a trained and responsible accountant. No business firm of half the size of a battalion would think of dispensing with the services of a cashier and of an accountant. The Battalion Paymaster should be responsible for *all* accounts normally maintained in a battalion, whether public, regimental or private. His main duty is to relieve combatant officers of all accounting duties and responsibilities.

The Clerical Staff

(*k*) Lastly, we come to the staff of clerks required for this suggested organization. The existing system and the inadequate

numbers of clerks authorized for a battalion are responsible for a very appreciable proportion of paper work which could be avoided altogether, and from throwing on to officers more clerical work than should be necessary. No business man running an office, however small, would think of doing so without the services of one or more trained stenographers and clerks. Why should a Commanding Officer, an Adjutant, a Quartermaster, a P.R.I., not to mention company commanders, be expected to run their large offices with untrained soldiers as clerks? And since they are required in addition to spend a good deal of their time outside their offices, it is an added reason for giving them trained and reliable clerks. A man joins the Army to become a soldier; very few have the necessary aptitude and education to become efficient clerks. Furthermore, it takes many years to acquire the required clerical efficiency and knowledge, and normally a soldier clerk is unable for various reasons, such as promotion, service expired, overseas service, etc., to remain in an office more than two years or so. Compared with their comrades, a clerk has longer hours of duty and greater responsibilities for which he receives no compensatory advantages. In fact, employment as a clerk often interferes with his chances of promotion.

I would therefore urge most strongly that :—

(*a*) An adequate number of clerks be authorized.

(*b*) Every authorized clerk be given some form of tradesman's rates of pay subject to possessing certain qualifications.

(*c*) Within the clerical establishment of a battalion a definite number of N.C.Os be authorized as clerks in order to retain as clerks soldiers who would otherwise wish to revert to duty in order to become N.C.Os.

The suggested organization allows for the following clerical staff :—

1 W.O., R.A.S.C. clerk.
1 W.O. II,[1] Technical stores Q.M.S.
2 W.Os, R.A.P.C.
6 N.C.O. clerks.
16 Private soldier clerks.

Total twenty-six men employed on clerical duties, *plus* 1 W.O. I [2] as Regimental Transport Warrant Officer, and 1 W.O. I as R.Q.M.S.

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[1] Warrant Officer, Class II.
[2] Warrant Officer, Class I.

At first sight, this appears a formidable total as compared with the present authorized establishment, but an impartial inquiry would reveal the fact that the number of men employed in clerical duties in the battalion to-day is between twenty and twenty-two *excluding*, of course, the suggested transport department which is a result of mechanization and does not yet exist in India. If therefore we add to this figure of twenty or twenty-two the three clerks (one W.O. and two clerks) allowed for the transport office we reach the figure of twenty-three or twenty-five as compared with the total of twenty-six now asked for.

A close scrutiny of the distribution of clerks in the suggested organization will, I think, show that the number provided in each office and section is quite reasonable, and even likely in practice to be found inadequate whenever the standard of qualification and efficiency of some of the clerks falls below a certain level. It must also be borne in mind that regimental clerks—as opposed to specialists like R.A.P.C. and R.A.S.C. clerks—are required to be efficient fighting soldiers, they have therefore to receive instruction in, and devote a good deal of time to, subjects outside their clerical duties. They are not like civil clerks, exclusively and solely clerks, they are fighting soldiers who are also required to work as clerks when not fighting or learning how to fight.

Conclusion

The fighting portion of the Army of to-day is being modernized at a tremendous cost. The handling of this portion will require the full time and energies of commanders and of all regimental officers.

It is, therefore, essential that these officers be relieved as much as possible of administrative duties and responsibilities, and it is even more essential that the administrative organization in a battalion or equivalent unit, be adequate in size, in knowledge, and in experience.

Unless the framework of the battalion is also modernized and strengthened, it will not bear the burden of the modern mechanized unit, and either administration will be inefficient and costly, or the vast expenditure on new weapons and new machines will be found to have been largely wasted when the test of war comes along. A pre-1914 framework and the few inexperienced soldier clerks authorized at present cannot, with the best will in the world, produce in the battalion of 1938 administrative as well as fighting efficiency.

AIR CONTROL IN OVAMBOLAND

By Major H. G. Willmott, South African Air Force.

IPUMBU, Chief of the Ukuambi tribe, had been a thorn in the side of the Native Commissioner of Ovamboland for some years, but had usually shown his respect for authority by paying a fine of cattle when ordered. In 1932, however, he again misbehaved, and on this occasion he decided that he would not pay the fine inflicted, at the same time adopting a hostile attitude towards the South-West African Administration. This attitude had an unsettling effect on the neighbouring tribes, and in order to avoid a possible general disturbance in Ovamboland the Administration decided that some immediate action should be taken against Ipumbu.

As it was anticipated that Ipumbu would resist any effort being made to collect the fine or to arrest him, and that he would probably be supported by his tribe, some eight hundred of whom were armed with rifles of sorts, it was considered that military action would be necessary. From previous experience in Ovamboland, it was known that it would be a costly affair to send a land force to deal with a tribe possessing such a determined chief and as well armed as the Ukuambi, and that it might possibly involve numerous casualties. In view of this, the South-West African Administration asked the Union Government to send aircraft to deal with the situation.

Topography

Before dealing with the operations against the Ukuambi, it would be as well to describe the topography and communications of Ovamboland, and to give some account of the inhabitants. Ovamboland is situated half in South-West Africa, the old German South-West Africa, and half in Angola, a Portuguese colony, the border between these territories being marked by a twenty-five foot cutting through the bush. When this international boundary was first fixed, tribal areas were not taken into consideration, and some tribes are half on one side and half on the other. Consequently, in order to keep a certain amount of peace along the border, it has been found necessary to establish a neutral zone ten miles wide.

The southern boundary of Ovamboland is formed mainly by the Etosha Pan, of which some description may be of interest. The Pan is about seventy miles long and twenty-five miles broad, and has a dead flat surface without a single growing thing on it. The surface, which is given a dirty white colour by its salty crust, is usually firm and dry, but has been known to be covered with water after exceptional rains. Round the edge, which is often swampy, there are a few water holes, but many of them are too brackish for drinking purposes. The good ones can easily be identified by the game paths leading to them. Although the country round the Pan is unsuitable for human habitation, it carries tremendous herds of game, some of which can always be found on the Pan itself where they appear to go for salt.

Ovamboland itself is a flat, sandy plain, intersected by numerous broad and shallow watercourses known as " Oshanas," which are usually dry. The northern part of the country is almost covered by belts of thick bush broken by the oshanas, while the south is open plain and uninhabited. In wet seasons the oshanas fill with water, and as they have no appreciable fall about half the country becomes flooded. This, however, is an exceptional condition, and normally the only water obtainable is drawn from shallow wells and pools, the contents of which are often unfit for human consumption.

No made roads of any description exist, but there are fairly numerous sand tracks which can be negotiated by motor vehicles during certain seasons. After heavy rains the oshanas form almost impassable barriers to all forms of transport. Ondonga, the headquarters of the Native Commissioner, is about one hundred miles from the nearest telephone line at Okaukweyo, and one hundred and eighty miles from the telegraph line at Outjo. Outjo, which is also the railhead, is one thousand six hundred miles from Pretoria, the headquarters of the Union Defence Forces.

Inhabitants

The native population on the South-West African side is estimated at one hundred and fifty thousand while the Europeans number about twenty-five. Following the usual native custom, the work is done by the women and the only occupation considered suitable for men is fighting. It is interesting to note that certain authorities trace the Ovambos to the Vandals who came originally from East Prussia (*Royal Geographical Journal*, 1919), but, as the Ovambos are quite black, this is a difficult theory to substantiate. The natives are divided into six tribes, occupying their own areas and under the control of their own chiefs. The Native Commissioner exercises a general supervision, and

acts as a court of appeal, but if it can be avoided does not interfere with tribal customs.

In 1917 Chief Mandune, a neighbour of Ipumbu, refused to desist from raiding into Angola, and it was found necessary to send a column of mounted riflemen to deal with him. This column met with endless difficulties, and were fortunate in obtaining an early decision by killing Mandune in the first engagement. The mounted riflemen sustained twenty-four casualties, eleven of whom were killed or died. In addition, one hundred and ninety-five horses and mules were lost, which clearly indicates that the country is not suitable for operations which depend on animals.

Operations against Ipumbu, 1932

On 22nd July, 1932, it was finally decided that seven officers and eighteen other ranks with three aircraft should be sent to Ovamboland. The Aircraft Depot at Roberts Heights got to work, and the same evening the personnel who were not flying, together with the necessary bombs, ammunition and stores, were sent off by train. Early next morning, three Wapiti aircraft left on the ten-hour flight to Windhoek via Upington and Keetmanshoop.

The 24th July was spent in Windhoek discussing the situation with the South-West African authorities, obtaining maps of Ovamboland, and waiting for the train. The first consideration was inter-communication, and for this purpose two wireless pack sets had been brought from Roberts Heights. It was decided to establish one of these at Ondonga, thirty-four miles from Ipumbu's kraal, and the other at Okaukweyo, the end of the telephone line. As there was no wireless station at Windhoek, the headquarters of the South-West African Administration, arrangements were made for the Ondonga set to operate to the Walvis Bay station, whence messages were relayed to Windhoek by telegraph. The set at Okaukweyo provided a connecting link between Ondonga and the telephone line for local communication. Okaukweyo, being the end of the telephone line and within easy striking distance of Ukuambi, was selected as the base. Another factor in making this selection was that Okaukweyo was the nearest place to Ondonga, outside Ovamboland, with a good water hole.

On the 25th July, two aircraft, carrying the Native Commissioner for Ovamboland, a wireless operator, and one of the pack sets, left for Namutoni at the East end of the Etosha Pan, while the third aircraft and the train proceeded to Outjo. From Namutoni, the passengers and wireless pack set were taken to Ondonga by motor lorry, and the aircraft flew to Okaukweyo to select an aerodrome site.

As this part of the country is uninhabited, except for a few Bushmen who are almost wilder than the game, it was necessary to have a " span " of fifty convicts sent from Outjo to clear the aerodrome. By the 28th July the base at Okaukweyo was established, and the necessary stores moved up from Outjo. The wireless stations were tried out and communications found to be satisfactory.

At this stage it may be as well to say something about the supply and transport arrangements. No transport or tentage was brought, and rations were bought locally as required. Ample transport was obtained in Outjo, but, as the vehicles were a very mixed lot, it was never quite certain how long they would take over their journeys, or what size load was going to arrive. The " live on the country " scheme for rations worked well, except that, as no hunting was permitted except for the " pot," there was a good deal of rivalry as to whose turn it was to shoot the daily meat ration. The question of accommodation was met by building reed huts where required.

Everything was now in readiness for the operation to start, but as the Administration were most anxious to avoid actual hostilities which might involve the killing of a number of the Ukuambi, it was decided to give Ipumbu a further opportunity of paying his fine. It was, however, no use, and on the 2nd August the three aircraft were sent to Ondonga to escort messengers to Ipumbu, instructing him to meet the Native Commissioner at a fixed place. This action appeared to have the desired effect, as Ipumbu agreed to be at the meeting-place the next day.

On the afternoon of the 3rd August the Native Commissioner set out to meet Ipumbu as arranged. As there was no military or police force to provide an escort, an air mechanic with a Lewis gun, which was kept hidden, accompanied the Native Commissioner, and an air escort was provided by the three aircraft. In addition, in order to give weight to the arguments of the Native Commissioner, it was arranged that, at a prearranged signal from the ground, the aircraft would carry out a bombing and machine gun demonstration. Ipumbu failed to keep his promise, but sent some of his headmen, accompanied by some two hundred armed tribesmen, to ask the Native Commissioner to come to his kraal. A warning of possible treachery having been received from friendly Ovambos, the request was ignored. The aerial demonstration was carried out for the benefit of the assembled Ukuambi, and was reported to have had an adverse effect on their morale, and to have shaken their loyalty to their Chief.

Diplomatic relations were now finally broken off, but before any offensive action could be taken, a full report on the situation had to be submitted to the Administration, and final authority obtained. On the

strength of this report the Officer Commanding the Air detachment was authorized to take what action he considered best, but was reminded that the selected course should be one which would involve the fewest casualties.

The Military Problem

The problem was to depose or kill Ipumbu himself with the minimum of other casualties. It was known that he had taken the arms from his old men and given them to the young ones. Eight hundred of the latter were now armed with rifles of sorts, and were reliably reported to be ready to support him. Eight hundred rifles in the thick bush were quite a problem, and it was necessary to use the Native Commissioner's extensive knowledge of Ovambo customs in order to find the answer. It appeared that if a chief left his tribal area, or if his kraal was destroyed by enemy action, it meant defeat in the eyes of his followers, who would then probably desert him. The plan of action decided on was, therefore, to bomb Ipumbu's kraal, and then to occupy it. In order to have a ground force for occupation, two armoured cars were requisitioned from Pretoria.

While waiting for the armoured cars to arrive, an advanced base was established near Ondonga, and the task of moving a large supply of bombs, ammunition, and petrol over the hundred miles of sand road from Okaukweyo was begun. In addition, the aircraft undertook daily patrols over Ukuambi, and frequently landed in the areas of surrounding tribes in order to gain information about any move Ipumbu might be considering. These visits established friendly relations with the neighbouring chiefs, from whom it was ascertained that they would take no action to assist Ipumbu. In order to make one last effort to intimidate the Ukuambi, the three aircraft were sent off one night with instructions to climb to five thousand feet, and to glide down slowly on to Ipumbu's kraal. On descending to five hundred feet the wing tip flares were to be ignited, and Verey lights fired in the hope of scaring the Ukuambi. The flight was carried out as arranged, but although many natives were seen sitting round camp fires, spies reported that they did not even look up.

Meanwhile the armoured cars had been sent off by train from Pretoria to Windhoek, where it was necessary to detruck them on account of the difficulty of carrying them on the narrow-gauge line to Outjo. The four hundred mile road journey to Ondonga presented many difficulties, but one car arrived in good order on the 14th August, the other being left half-way with water trouble. The chief difficulty experienced in moving the cars, which were Crossleys fitted with solid tyres, was the

fact that their track did not coincide with the tracks made in the sand by other motor vehicles. This difficulty was overcome with towing assistance from a six-wheeled railway lorry, and where the sand was very thick, by laying four-inch pipes over which the double rear wheels of the armoured cars fitted.

The Attack

On the 13th August, hundreds of copies of a pamphlet which read as follows were dropped over the Ukuambi territory: "Ipumbu was instructed by the Government to surrender himself. He has not done so. He is no longer Chief of the Ukuambi. To-morrow his kraal will be destroyed. Everybody is warned to keep away."

The plan of action for the 14th was simple. The armoured car was to be at an arranged point about five hundred yards from Ipumbu's kraal at 9 a.m., at which time the aircraft were to begin bombing. If the armoured car was late, the aircraft were to wait until it was in position. Intercommunication was by dropping and picking up messages, and a prearranged code of signals, one of which was the firing of Verey lights from the armoured car if it was attacked.

When the aircraft arrived over the kraal on the 14th, no Ukuambis were to be seen, but immediately the first salvo dropped some three hundred armed men appeared out of the surrounding bush and walked away; none of them ran. A good many direct hits on the kraal were achieved, but there was no sign of life, nor, owing to its heavy stockade structure, was it destroyed.

As soon as the bombing ceased the armoured car drove up to the kraal. Immediately a string of Verey lights appeared through the dome, and as this was the signal that the armoured car was being attacked, the aircraft shot up any likely bit of cover with front and back guns. It was later explained by the crew of the armoured car that Ipumbu must have been a keen apiarist, and that when the bombs fell in the kraal, the bees were disturbed, and flew to the best beehive they could see. As this happened to be the open dome of the armoured car, the Verey lights were fired in an endeavour to smoke them out. Having dealt with the bees, the crew of the armoured car set the kraal on fire, and proceeded to a pan named Knobkerrie Pan, about half a mile away. Two aircraft then landed on the Pan, the third remaining in the air.

Shortly after the aircraft had landed, two or three of the Ukuambi, who came in to surrender, gave the information that on the previous evening Ipumbu together with a few of his bodyguard had gone to one of his cattle posts. The post was immediately located and bombed,

but unfortunately Ipumbu escaped, and crossed the border into Portuguese territory. But the action had achieved its aim, and Ipumbu, having left his tribal area, was no longer Chief of the Ukuambi.

Cleaning Up

During the next few days some hundreds of the Ukuambi men, including Figamini, Ipumbu's son, came to surrender, bringing their arms and ammunition with them. By the 19th, for which day a tribal meeting had been arranged, some five hundred rifles and many thousands of rounds of ammunition had been collected. About one thousand three hundred tribesmen turned up for the meeting, and peace was declared, with the understanding that the Native Commissioner would be appointed Chief in order to avoid further trouble. However, all was not over, as on the 20th, news was received that Ipumbu, having found that he was not wanted in Angola, had returned to his old haunts in Ovamboland.

On the 22nd, the aircraft, the six-wheeled railway lorry, and a few trackers from the Ukuanyama tribe began a round-up, and by 11 a.m. the trackers had found Ipumbu, and brought him to Knobkerrie Pan. Ipumbu, an old man, was brought in carrying a combination rifle and shotgun together with some two hundred rounds of ammunition, but as he was travelling light, he had abandoned his trousers. He immediately insisted on Figamini taking off his trousers, so that he could wear them himself. Ipumbu was packed into the back of a Wapiti with the Native Commissioner and flown to Ondonga, from where he was exiled, together with six of his wives and some of his cattle, to the eastern corner of Ovamboland.

REGIMENTS OF THE GLORIOUS REVOLUTION

TWO HUNDRED AND FIFTIETH ANNIVERSARY

By MAJOR T. J. EDWARDS, M.B.E., F.R.Hist.S.

" For many generations to come the Revolution of 1688–9 was spoken of by our ancestors as ' the glorious revolution.' Its glory did not consist in any deed of arms, in any signal acts of heroism on the part of Englishmen. . . . The true glory of the British Revolution lay in the fact that it was bloodless, that there was no civil war, no massacre, no proscription, and above all that a settlement by consent was reached of the religious and political differences that had so long and so fiercely divided men and parties." [1]

DURING this year and next, a number of our regular regiments, which took a leading part in the events of this " Revolution," will celebrate the 250th year of their formation. The time, therefore, seems opportune for a brief review of the circumstances in which these regiments came into existence. To appreciate the causes of " The Glorious Revolution," it is necessary to survey the events following upon the defeat of the rebels in July, 1685, at Sedgemoor. The successful suppression of the rebellion did not bring complete peace of mind to James II : it did, however, lead him into the belief that no one could oppose his will. On the other hand, it was apparent to him, as to many other highly-placed people, that had the revolt been better organized there would have been no doubt about its success. The rebellion had brought him a large augmentation to his army, and he was determined to retain as many regiments as he could, instead of disbanding them when the rebels had been very thoroughly suppressed. To do this he had to have money, about £600,000 a year, and by neglecting the Navy, putting off the payment of his brother's, the late King's, debts and other expedients, he managed it without the aid of Parliament. The next thing was to place the chief commands in the hands of Roman Catholics, but the Test Act stood in the way.

Under the Test Act, passed in 1673, all Nonconformists (Protestant and Roman Catholic alike) were excluded from holding official positions. It was this very Act that drove James himself, because he was an avowed Romanist, from the office of Lord High Admiral. Such an Act could, however, be circumvented under the Dispensing Power of The

[1] " History of England," by G. M. Trevelyan.

King. James thereupon consulted his Chief-Justice, and a test case was "put up." The subject of the case was Sir Edward Hales, who, although a Roman Catholic, had accepted a Commission in the Army, as Colonel of the Corps now known as The West Yorkshire Regiment. An action was brought against him, which he lost. It then went to the King's Bench, where twelve "obedient judges" gave a judgment in The King's favour by granting him Dispensing Power to set aside the Test Act.

Armed with this power, James began to remodel the Army. With the object of overawing London, he concentrated between 13,000–16,000 soldiers on Hounslow Heath. The public were at first alarmed at such a large permanent camp being situated on their very doorstep; but these feelings soon passed away, and both soldiery and public treated the place as one of amusement and scenes of merriment were constantly to be witnessed there on holidays. "Still, merry as the camp might be," writes Fortescue (i, 304), "there were not wanting signs of a graver spirit beneath the new red coats. There were rumours of quarrels between Protestant and Catholic soldiers, ominous to the Catholic officers whom James had set in command against the law. Agitators scattered tracts appealing to the Army to stand up in defence of the liberties of England and the Protestant religion; and the Londoners perceived, what James did not, that consciences cannot be bought for eightpence a day, nor flesh and blood transformed by a red coat and facings." It is clear that James was not making much headway with the conversion of the English and Scots regiments to Roman Catholicism. If he were slow to grasp this fact at first, it came home to him rather rudely when he learned that the soldiers cheered with delight on receiving the news that the seven Bishops, who refused to read his Declaration which suspended the penal laws against Catholics, were released from the Tower. The Army's staunchness to the Protestant religion alarmed James and he broke up the camp, sending the regiments all over the country. Having thus isolated them, he began to work upon them individually, but met with no better success.

In Ireland his efforts proved more fruitful. "Already," writes Fortescue, "in 1686, the King had sent a degenerate Irishman, the Earl of Tyrconnel, to ensure the Popish ascendancy, at any rate in Ireland; and no better man could have been found for such mischievous work than 'lying Dick Talbot.' The Army in Ireland consisted at the time of his arrival of about 7,000 men: within a few months Tyrconnel, by wholesale dismissal of all Protestants, had turned it upside down."

The country bore these things with a good deal of patience so long as the heirs to the throne were James's Protestant daughters, Mary and

Anne. " But with the birth of a male heir, son of the Italian Princess, the prospect opened out of a long succession of Jesuit-loving and foreign-hearted Kings." [1] This was the last straw: no time was lost in sending an invitation to James's son-in-law William, Prince of Orange, the champion of Protestantism on the continent, to come to the relief of the country. William soon made preparations for his expedition to England, but as at this time he was expected to go to war against France, his true designs were not known for some months.

HOLLAND

King James next turned to Holland. At the time of Monmouth's Rebellion in 1685, there were serving in that country three English and three Scottish regiments. James asked his son-in-law to lend him the three English regiments, but as they had been fighting in the Protestant cause they demurred. Their scruples were eventually overcome and they came to England. The three Scottish regiments had already arrived. But none of these six regiments took part in the Sedgemoor campaign, and they returned to Holland at its conclusion. Whilst they were in England, James so much admired their fine appearance and efficiency that, when he wished to augment his Army in the spring of 1688, he sent to William for the loan of them again. But William, having an eye to future possibilities, refused to part with them. James was so enraged by this refusal that he issued a Warrant outlawing all " Our natural-born subjects who are now in the service of the States General of the United Provinces of the Netherlands, being either mariners and seafaring men, or officers and soldiers serving at land," unless they returned " to their native countries " within a few months: if they did not so return, " We do hereby authorise and command all and every Our Captains, masters and other officers serving and employed in any of Our ships or vessels at sea, or elsewhere, and all and every Our subjects whom it may concern, to seize, take and bring away all such officers, mariners, and soldiers, and other persons aforesaid, as shall be found to be employed, or continue in the service aforesaid, in contempt of, and contrary to, the true intent and meaning of this Our Proclamation. Given at Our Court at Whitehall, 14th March, 1687–8, in the fourth year of Our Reign." This outburst of royal anger had little effect upon the Protestant officers and soldiers serving under William, but he did give the Roman Catholics in these regiments the opportunity of leaving his service. The three English and three Scottish regiments accompanied William when he came to England in the following November.

[1] " England under the Stuarts," by G. M. Trevelyan.

When James learned definitely that William was preparing an expedition against him he took steps to augment his Army, and one of the earliest regiments to be raised at this time was that under the Colonelcy of Solomon Richards, whose Commission is dated 27th September, 1688. When William landed in England the regiment transferred its allegiance to him. It was later numbered the 17th Foot, and is now The Leicestershire Regiment. Richards did not remain long in the Colonelcy: he was sent to relieve Londonderry, but left it prematurely, and as a consequence was deprived of his regiment and dismissed the service in May, 1689. Another infantry regiment raised at this time was Colonel Archibald Douglas's, whose commission as Colonel is dated 9th October, 1688. Douglas also had a short term as Colonel, being removed therefrom in December, 1688, because he would not take the oath to William. This regiment was later the 16th Foot, and is now The Bedfordshire and Hertfordshire Regiment. William landed at Torbay on 5th November, 1688. James had ordered a concentration of his troops at Salisbury, but when he arrived he was informed by Lord Feversham, his General-in-Chief, who had also commanded the Royal Forces at Sedgemoor, that the officers were not to be trusted. Within a few days all those upon whom he had relied for support—Churchill, Grafton, Kirke and Trelawney—had deserted him. His last despairing act before leaving for France was to sign an order disbanding his entire army, but it was ignored.

It has been mentioned that the six British regiments in Dutch service came over with William. Two of these, raised about 1674, came on to the British establishment and were later numbered the 5th and 6th Foot, being now, respectively, The Royal Northumberland Fusiliers and The Royal Warwickshire Regiment.

Among the regiments raised by William after James had fled from the country, none had a more romantic origin than The Earl of Devonshire's Horse. The Earl was a staunch supporter of the Protestant cause, and as soon as William set his foot in this country he went to Derby and invited the gentry and yeomen to follow his example. Whilst there he learned that some of James's supporters had plotted to seize him, so he moved on to Nottingham, where he found the countryside definitely pro-William. Here he organized some troops and companies. Meanwhile, the Princess Anne (later Queen Anne) had decided to leave London and go to Nottingham, which she did on the 25th November, 1688. During her journey from London a rumour reached the Earl that some of James's party intended to intercept her and carry her back to London, whereupon he hastily gathered together some troops of Horse, rode out to meet the Princess, which he did, and escorted her

safely to Nottingham. When news of the Earl's conduct reached William it so pleased him that he commissioned the Earl to raise a regiment of Horse for permanent service from among his troops. This he did, his Colonel's commission being dated 31st December, 1688. In 1788 this regiment was converted to Dragoons with the title of 7th Princess Royal's Dragoon Guards; in 1922 it was amalgamated with the 4th Dragoon Guards to form the present 4th/7th Royal Dragoon Guards.

A certain number of independent troops of horse and companies of foot were raised by the supporters of the Prince of Orange on his landing in England, most of which were incorporated into regiments when the Orange cause was firmly established. All of these regiments, with the exception of two, had a brief existence, being disbanded after the conclusion of the Peace of Ryswick in 1697. The two exceptions were the foot regiments of Francis Lutterell and Sir Robert Peyton. Both regiments were formed in February, 1689, but their Colonels' Commissions were dated from their original service in November, 1688. Lutterell's Regiment was later numbered the 19th Foot and is now The Green Howards, while Peyton's was numbered the 20th Foot and is now The Lancashire Fusiliers.

Ireland

In March, 1689, James landed in Ireland with a body of French troops; he soon made himself master of Southern Ireland, but in Ulster he met with staunch resistance from the Protestant population. Those who could, sought the shelter of Londonderry and Enniskillen, which successfully resisted all efforts of James's besieging forces. From the inhabitants in the beleaguered towns several regiments of horse and foot were raised, and how well they acquitted themselves is now a matter of history. When the siege was raised and James driven southward, some regular regiments were formed from the troops which had defended these towns, and they were brought on to the establishment from 1st January, 1690. Those of Londonderry had but a brief existence, as also some of Enniskillen, but of this latter place some are still with us, viz.: Colonel James Wynne's Regiment of Dragoons, later known as the 5th Royal Irish Lancers, but since 1922 amalgamated with the 16th Lancers to form the present 16th/5th Lancers. Another Dragoon Regiment was Sir Albert Cuningham's, later The Inniskilling (6th Dragoons), now amalgamated with the 5th Dragoon Guards to form the 5th Royal Inniskilling Dragoon Guards.[1] An infantry regiment under the Colonelcy of Zacharia Tiffin—now The Royal Inniskilling Fusiliers—also had its origin in these circumstances.

[1] Thus, by a curious turn of fate, a regiment which was raised to support James (5th Dragoon Guards—1685) is joined to one raised to oppose him—The Inniskillings.

In preparation for his campaign against James and Louis, William raised numerous regiments in the Spring of 1689, but only three remain to-day, all being raised upon the Welsh border in March, 1689; they are the Duke of Norfolk's Regiment, later 22nd Foot and now The Cheshire Regiment; Lord Herbert of Cherbury's Regiment, later the 23rd Foot and now The Royal Welch Fusiliers; and Sir Edward Dering's Regiment, later 24th Foot and now The South Wales Borderers.

Scotland

Events were taking a different course in Scotland, but reacted ultimately for the benefit of the Orange cause. The story commences with Charles I who attempted to force Episcopalian Church government upon the Presbyterians in Scotland. There was great resistance to this high-handed measure, and the people banded themselves together in a National League and Covenant. Charles II followed the example of his misguided father and met with the same ill-success. He therefore removed all Presbyterian ministers from their churches and put Episcopalians in their place. In 1679 the Covenanters took up arms against the government, whereupon Charles II sent his natural son, the Duke of Monmouth, with a force and routed them at Bothwell Brig. It was in these circumstances that a famous character was emerging, to whit, Richard Cameron, the founder of a strict sect of Presbyterians called after him "Cameronians." A price was placed upon his head and, although he eluded the Royal forces for several years, he was eventually taken fighting, and beheaded in July, 1680.

With the coming of William, relief came to the sorely-tried Presbyterians, and they accepted him as their King. On the 18th March, 1689, the Earl of Leven raised a complete regiment from among the Presbyterians in one day, or in the words of the *London Gazette* for Monday, 25th March, 1689, the Convention "ordered 800 men to be levied under the command of the Earl of Leven, who likewise came over with His Majesty; which were raised and armed in two hours' time, and appointed to guard the town," i.e., Edinburgh. This regiment was later numbered the 25th Foot and is now The King's Own Scottish Borderers. Its badge is, appropriately, "The Castle of Edinburgh," and its two mottoes indicate its religious origin—"Nisi Dominus frustra" and "In Veritate Religionis confido."

Matters did not move so fast with Richard Cameron's followers. They did not like the idea of being formed into a regiment and joining the same force which had recently been persecuting them. Eventually, however, all their doubts were swept aside, and they, from their own sect of "Cameronians," also raised a regiment "all in one day," under

the Colonelcy of the Earl of Angus (then a lad of eighteen years) whose Commission is dated 19th April, 1689. This regiment was later numbered the 26th Foot which in 1881 was amalgamated with the 90th Foot to form the present regiment—The Cameronians (Scottish Rifles). As a reminder of the days when the Covenanters had to keep a sharp look-out at the Conventicles in the hills and glens for the approach of the Royal troops who were " hunting " them, an interesting custom is still observed in the 1st Bn. The Cameronians—the old 26th, when at Divine Service in camp or in the open. Picquets are sent out, under an officer, to all points of vantage near the scene of the service : they go through the formality of looking round for Charles II's and James II's troopers who harassed them. This done, the officer returns to the waiting battalion, and not until he has reported " All Clear " are the picquets withdrawn and the service proceeds.

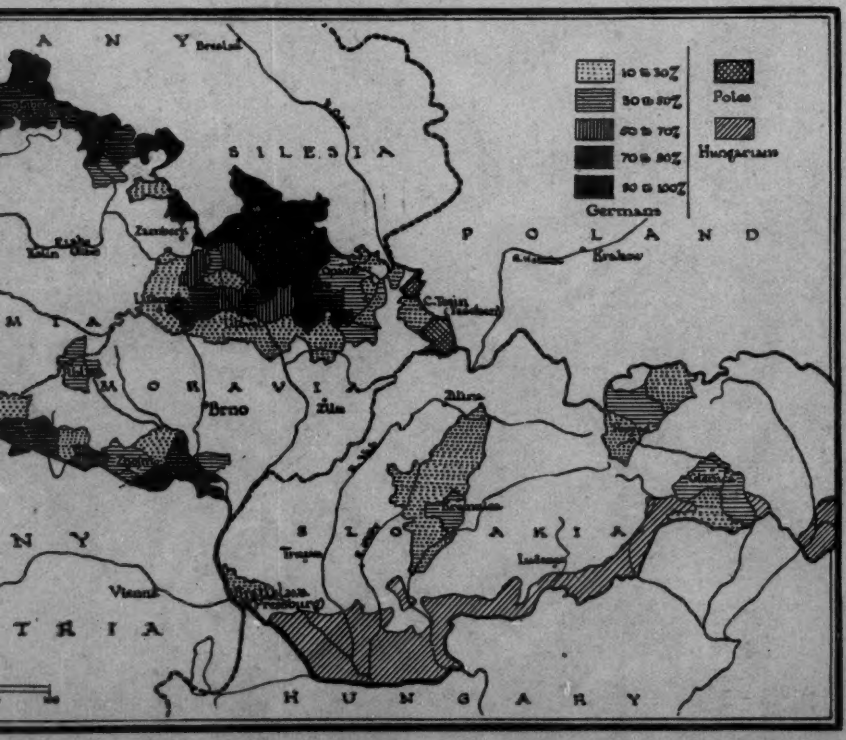
William's troubled life came to an end in 1702, but not before he had taken steps to ensure the Protestant Succession to the Throne by the passing of the Act of Settlement, thus consummating the work of " The Glorious Revolution " and by laying the foundations of the Army that later gained immortal fame under the inspired leadership of John Churchill, Duke of Marlborough.

PRE-W

THE VARIED PEOPLES OF CZEC

(Map reproduced from the Bulletin of Inte

PRE-WAR AND POST-WAR BOUNDARIES



S OF CZECHOSLOVAKIA AS CREATED BY THE VERSAILLES TREATY

lletin of International News *by courtesy of the Royal Institute of International Affairs*)

THE INTERNATIONAL SITUATION

THE EUROPEAN CRISIS

THE recent crisis, which so nearly culminated in war between Britain, France, Czechoslovakia—and perhaps Russia, on one side; and Germany—and possibly Italy, on the other, sprung from five main causes:—

(1) The inclusion in the State of Czechoslovakia, as created by the Versailles Treaty, of large tracts of territory whose inhabitants were essentially Austro-Germans by race, language and sympathies.

(2) The bad treatment of this minority by the Czechoslovak governments for some twenty years.

(3) Deliberate exaggeration of grievances and the most unrestrained abuse of the Czechs and their leaders by the German Press, terminating in Herr Hitler's threat to liberate these Sudeten Germans by force.

(4) The determination of Britain and France that Germany should not seize on the excuse that she was rescuing her nationals to overrun the whole of Czechoslovakia and thus make herself the dominant Power in middle Europe.

CZECHOSLOVAKIA

Before the Versailles Treaty there was no such country as Czechoslovakia; the Czechs and Slavs were peoples with national characteristics, but for nearly three hundred years they had been part of the Austro-Hungarian Empire.

In creating the new republic, the makers of the Treaty drew those boundaries which would be contiguous to Germany along the naturally strong strategical line of the old Austro-German frontier. But in doing so they left a legacy to the new-born State which very nearly brought about another world conflagration; for included within its borders were over 3,000,000 Austro-Germans, 692,000 Hungarians, and 81,700 Poles. The Treaty makers cannot, however, claim that they were influenced solely by strategical considerations, much less were they giving effect to the principle of "self-determination," about which so much was said and written at that time. In many respects, as Lord Chatfield said in

his maiden speech in the House of Lords,[1] this was " not a Peace Treaty so much as a punishment ; . . . we were bitter, and we all share in whatever blame there was for the terms of the Treaty. There were many who wished it had been more severe. . . ."

Sudeten Germans' Grievances

Having suffered from a sense of inferiority for so long, it was perhaps natural that peoples like the Czechs and Slavs should over-assert their newly-acquired political powers and domestic authority. Lord Runciman, from his expert but entirely detached and unbiased point of view, has summed up the situation in a letter to the Prime Minister of 21st September, 1938, as follows[2] :—

" It is a hard thing to be ruled by an alien race ; and I have been left with the impression that Czechoslovak rule in the Sudeten areas for the last twenty years, though not actively oppressive and certainly not ' terrorist,' has been marked by tactlessness, lack of understanding, petty intolerance and discrimination, to a point where the resentment of the German population was inevitably moving in the direction of revolt. The Sudeten Germans felt, too, that . . . they had been given many promises by the Czechoslovak government, but that little or no action had followed these promises. This experience had induced an attitude of unveiled mistrust of the leading Czechoslovak statesmen." In the 1935 elections the German element formed the second largest party in the State Parliament and commanded 44 votes out of 300. Subsequently they became the largest united party. But they could always be outvoted and consequently felt that constitutional action was useless to them.

" Local irritations were added to these major grievances. Czech officials and Czech police, speaking little or no German, were appointed in large numbers to purely German districts ; Czech agricultural colonists were encouraged to settle on land transferred under the Land Reform in the middle of German populations . . . there is a very general belief that Czech firms were favoured as against German firms in the allocation of State contracts and that the State provided work and relief for Czechs more readily than for Germans. Even as late as the time of my Mission, I could find no readiness on the part of the Czechoslovak government to remedy them on anything like an adequate scale. All these and other grievances were intensified by the reactions of the

[1] See Hansard (Official Report of Parliamentary Debates—House of Lords), Vol. 110, No. 98, of 3rd October, 1938. H.M. Stationery Office. Price 6d.

[2] White Paper, " Correspondence respecting Czechoslovakia," Cmd. 5847. H.M. Stationery Office. Price 3d.

economic crisis on the Sudeten industries. . . . For many reasons . . . the feeling among the Sudeten Germans until about three or four years ago was one of hopelessness. But the rise of Nazi Germany gave them new hope. I regard their turning for help towards their kinsmen and their eventual desire to join the Reich as a natural development in the circumstances," says Lord Runciman.

The grievances of the Sudeten Germans were brought to the notice of the League of Nations again and again, but, as usual, that body proved quite futile when faced with the problem of taking collective action to rectify the mistakes of the Versailles Treaty. As time went on tension increased and it became clear that what had been a domestic squabble was likely to become an international incident.

GERMAN INTRUSION

Having swallowed up Austria without obstruction, Germany was in a much stronger position to support her Sudeten compatriots; on the other hand, France and the Soviet Union had pledged their support to Czechoslovakia. Britain was not directly concerned, nor had she committed herself in any way regarding this bone of contention. But one thing was very clear—if France should find herself compelled to take up arms against Germany over a matter which she considered of vital importance, Britain would be compelled to go to the aid of France: the integrity of Czechoslovakia might not be as important to us as to our late ally, but the security of France from German invasion has become more and more inseparable from our own security.

For Herr Hitler, therefore, the problem was not nearly so simple as the occupation of Austria. Nevertheless he proceeded to apply the same methods which had brought him such successful results before—exaggeration of the grievances of oppressed Germans in order to justify his claims; propaganda of a kind to produce almost hysterical enthusiasm at home in order to ensure unity amongst his own followers; threats to use armed force if all else failed in order to intimidate statesmen of other countries who had pledged themselves to preserve peace.

When Lord Runciman's Mission went to Prague at the beginning of August last, efforts were directed towards securing a settlement along the lines of some form of home rule for the Sudeten Germans. Herr Henlein at a Sudeten German congress at Karlsbad on 24th April enumerated "eight points" which formed the basis of their demands. These did not entail complete severance from Czechoslovak rule, and the government of that country at last felt constrained to adopt a conciliatory policy. But there ensued a process of offer and refusal which precluded any firm bargain being struck. On 6th September a

so-called 4th Plan was put forward by the Czechoslovak government; of this Lord Runciman said: "In my opinion—and, I believe, in the opinion of the more responsible Sudeten leaders—this plan embodied almost all the requirements of the Karlsbad 'eight points,' and with a little clarification and extension could have been made to cover them in their entirety." "But," he adds, "little doubt remains in my mind that the very fact that they were so favourable operated against their chances with the more extreme members of the Sudeten German party." Incidents were provoked by the latter to interrupt the negotiations, and eventually Herr Hitler heaped inflammable fuel on to the flames of trouble by a wildly provocative speech at Nuremberg on 12th September.

The Czechoslovak government found it necessary to impose martial law in the disaffected districts. For the time being this had a salutary effect; rioting died down, and the extremists fled to Germany, from which shelter they issued abusive and challenging proclamations. Meanwhile the German Press was whipped into a state of frenzy by the Minister of Propaganda—Dr. Goebbels, and a campaign of abuse and personal vilification which would disgrace a semi-civilized State was waged with unceasing virulence.

Mr. Neville Chamberlain has stated that, in July, when the controversy was already foreseen, the British Government deliberately chose a policy of mediation in preference either to threats of war or indifference; but Berlin was repeatedly warned of the ill-effects of military measures. Before the Nuremberg speech our Ambassador in Berlin made known to all the leading National Socialist leaders the British view, and Mr. Chamberlain personally took steps to emphasize that Britain would probably help France if the latter were involved. There can be no question, therefore, that Herr Hitler must have been fully aware of what he would be faced with if he went too far. But the trouble was that he was rapidly getting into a cleft stick—to retreat would mean a loss of prestige which no dictator could risk; to press forward ruthlessly meant war—and a war in which he could not confidently count on a single friend, although doubtless he hoped for the more or less active support of Italy.

It was at this juncture and in this electric atmosphere that, on 15th September, the British Prime Minister took the courageous, if unconventional, course of flying to Munich to see the German Chancellor in the peaceful setting of the latter's home at Berchtesgaden. He was warmly welcomed both by Herr Hitler and the local German people. "At this first conversation," said Mr. Chamberlain in his subsequent speech to the House of Commons[1] . . . I soon became aware that the

[1] On 28th September, 1938.

position was much more acute and urgent than I had realized. In courteous but perfectly definite language Herr Hitler made it plain that he had made up his mind that the Sudeten Germans must have the right of self-determination and of returning if they wished to the Reich. If they could not do this by their own efforts, he said, he would assist them to do so, and he declared categorically that rather than wait he would be prepared to risk a world war."

Eventually the German Chancellor agreed to refrain from hostilities while Mr. Chamberlain consulted his colleagues as to whether the British Government was prepared to accept the principle of self-determination in relation to the territories in dispute and to discuss ways and means of giving effect to it. In recalling this conversation the Prime Minister remarked: "I have no doubt now, looking back, that my visit alone prevented an invasion, for which everything was ready," and which, as he remarked, no one could have prevented.

The Prime Minister returned to London by air, and a Cabinet meeting was held that same evening. Lord Runciman was invited to attend. The latter blamed the Sudeten extremists for the breakdown of the negotiations at Prague, but expressed the opinion that the Sudeten population in the frontier district, where they were in the majority, should be given the right of self-determination at once. Moreover, he considered that the integrity of Czechoslovakia could only be maintained if her policy was directed to enabling her to live at peace with her neighbours—this implied a policy, similar to that of Switzerland, of neutrality and non-aggression on her part and guarantees for her security by the principal European Powers.

Before replying to Herr Hitler, the Government naturally decided to consult the French government, and M. Daladier—the French Premier, and M. Bonnet—Foreign Minister, flew from Paris, arriving on 18th September. The French representatives were in agreement with the Runciman proposals and a joint intimation was sent to the Czechoslovak government that "the further maintenance within the boundaries of the Czechoslovak State of the districts mainly inhabited by the Sudeten Germans could not continue any longer without imperilling the interests of Czechoslovakia herself and of European peace." They were urged to agree immediately to the direct transfer to the Reich of all areas with over 50 per cent. Sudeten inhabitants. At the same time they were informed that H. M. Government was prepared to join in an international guarantee of the new boundaries. This, said Mr. Chamberlain, was a completely new commitment for Britain, as hitherto we had no obligations towards Czechoslovakia other than those involved in the League Covenant.

After some demur the Czechoslovak government, on 21st September, accepted the Anglo-French proposals unconditionally. The following day that government resigned, but the new government formed under General Sirovy promptly agreed to accept the proposals.

A GERMAN ULTIMATUM

On 22nd September the Prime Minister again flew to Germany and met Herr Hitler at Godesberg. He was amazed to find that the Chancellor had shifted his ground and was not now prepared to agree to the Anglo-French plan for the orderly transfer of the territory to be ceded. Herr Hitler justified his attitude by saying that the proposals would be too dilatory and provide the Czechs with too many opportunities for evasion. After an exchange of memoranda, in order that there might be no mistake as to what each of the two statesmen had in mind, Mr. Chamberlain had a final meeting with Herr Hitler which lasted until the small hours of the morning of 23rd September; during this interview he was handed a memorandum and map. The former, the Prime Minister described as "an ultimatum rather than a memorandum"; more particularly as now for the first time during the negotiations the German Chancellor demanded a time limit. Mr. Chamberlain subsequently informed Parliament that thereupon "I spoke very frankly; I dwelt with all the emphasis at my command on the risks which would be incurred by insisting on such terms, and the terrible consequences of a war, if war ensued." He undertook to send the memorandum on to Prague, and this was done, but without any recommendation to the Czechoslovak Government by either Britain or France that they should accept it.

Meanwhile, on 23rd September, President Benesh had ordered the mobilization of the Czech army, and on 25th the Czech Minister in London handed a Note to our Foreign Secretary declaring that Herr Hitler's Godesberg demands were absolutely and unconditionally unacceptable. The French Ministers, who on Mr. Chamberlain's return from Godesberg had again flown to London, again emphasized that France would honour her obligations to Czechoslovakia in the case of unprovoked assault.

BRITAIN'S WARNING TO GERMANY

In a further effort to preserve peace, the Prime Minister proposed to the German Chancellor that, instead of military action—which the latter had threatened to take should his demands not have been acceded to by 1st October—there should be immediate discussions between German

and Czechoslovak representatives in the presence of British representatives. This suggestion was rejected on the grounds that it would lead to intolerable procrastination. Whereupon the British Ambassador in Berlin was directed to make it clear that if Germany attacked Czechoslovakia and the forces of France in consequence become actively engaged in hostilities against Germany, the British Government would support them.

By now the sands of diplomatic negotiation were fast running out : ultimatum had been met by ultimatum ; war seemed inevitable—and this, it would seem, all because the German dictator had worked himself and the less sober elements of his people into a state of frenzied impatience which ignored all sane reasoning or systematic planning for giving effect to all the essentials of their demands. No wonder Herr Hitler found himself becoming more and more isolated by world opinion.

HITLER'S REAL AIMS

Here, however, we may well question what were his real aims. Mr. Chamberlain has said that Herr Hitler told him that he never expected the British Government to accept the principle of self-determination for the Sudeten Germans ; in other words, he had counted on having to use military force. The German Chancellor also said that he *had* made a response to Mr. Chamberlain by withholding the operations which he had planned and by offering a frontier very different from the one which he would have taken as the result of military conquest. In view of these admissions and the continual refusal up to this stage to come to terms, it is only natural to conclude that Herr Hitler did not desire a peaceful settlement because he intended to overrun the whole of Czechoslovakia as he had overrun Austria. Strategically that country formed an obtrusion into the new Germany which might be used as a jumping-off place for Soviet aircraft in a war with those two Powers (Berlin is but 120 miles from Czech territory), and from that aspect it could be argued that it was a menace to German security. But it was also a barrier to German ambitions ; with Czechoslovakia in his hands Hitler could dominate Roumania and her invaluable oil supplies ; moreover, he would be a step nearer straddling Europe to the Black Sea. But even more serious from the British point of view is the fact that he would then be a step nearer the Adriatic : we cannot accept a situation which would mean both German and Italian naval bases on the flank of our sea-route through the Mediterranean. It is that potentiality, no less than threats to the Channel ports, against which we must be continually on our guard. If Germany has ambitions in the Mediterranean we must

be prepared to frustrate them no less than if she once again had ambitions which would directly threaten English territory and our home waters.

BRITISH PREPARATIONS FOR WAR

The rest of the story of this crisis is one of the most dramatic in international history. The role of Britain's Prime Minister as mediator seemed to be at an end ; nothing seemed to remain but for her to be as good as her word and support France in defending Czechoslovakia by force of arms. The following is a brief diary of the most important Service events during these vital days :—

26th September.—The War Office and Air Ministry called out the anti-aircraft and coast defence units of the Territorial Army, and the fighter and balloon barrage squadrons of the Auxiliary Air Force.

27th September.—The Admiralty announced that it had been decided to mobilize the fleet.

28th September.—Following on the issue of a Royal Proclamation, men of the Royal Fleet Reserve Class B joined their depots, and from there were immediately dispatched to their ships or other war stations.

Other naval reservists and officers were warned that they would receive individual calls as required.

The War Office announced the formation of a Women's Auxiliary Territorial Service.

In the civil world, the Food Defence Plans Department arranged that prices of essentials should remain unchanged for 14 days. It was also announced that the prices of coal and petrol would be unaltered for the same period. Plans were prepared to evacuate some 500,000 children from the London area. Gas-masks were served out all over the country by the local organizations. Trenches were dug in the big parks in and around London as air-raid shelters.

None of these intensive preparations for hostilities could have escaped the notice of the diplomatic representatives of Germany in this country, and it is safe to assume that they speedily reported to Berlin that Britain obviously meant business.

ITALY AND THE UNITED STATES

Meanwhile other influences were at work to persuade Herr Hitler that his determination to use force could only mean disaster for his country, and incidentally for the whole of his regime. On 26th September President Roosevelt had made an appeal " on behalf of 130,000,000

people of the United States " for a peaceful settlement. To this Herr Hitler replied next day that the German Memorandum represented the Reich's last word, and the Czechoslovak government must be held responsible for the issue of peace or war. On 28th September, the President sent a second message in the course of which he summarized the whole position in a sentence which read :—

" . . . All matters of difference between the German government and the Czech government should be settled by pacific means . . . a use of force on a scale likely to result in a general war is as unnecessary as it is unjustifiable."

Mr. Chamberlain, too, had not relaxed his efforts. He made a final appeal to Herr Hitler during the night of 27th–28th, and at the same time sent a personal message to Signor Mussolini asking him to use his good offices to bring the German Chancellor to reason. The Duce responded immediately to this request and instructed his Ambassador in Berlin to see Herr von Ribbentrop, although he reaffirmed his pledge that Italy would " stand by Germany."

THE CLIMAX

The climax to these days of strain and tense anxiety came at the very end of Mr. Chamberlain's speech to the House of Commons on the afternoon of 28th September, when he stated that he had just received an invitation, which included Signor Mussolini and M. Daladier, to attend a Four Power conference in Munich the following day: the German Chancellor had at last seen the red light; he might press home his advantage for all it was worth—and he has done so—but there would be no war.

Time and space will not permit the final negotiations and settlement of the Czechoslovak crisis to be recorded in this Journal; but certain aspects of it should stand out in high relief: from first to last Britain has played the part of mediator and thereby saved Europe, and perhaps the World, from a tragic conflagration, and Czechoslovakia from destruction. We sought nothing for ourselves, and surrendered nothing which we had sworn to safeguard. It would have been wholly incompatible with the role which we had assumed if we ourselves had threatened to use force in order to weight the scales on either side. It was only when the German Chancellor seemed determined to reject mediation that the Prime Minister made it clear that he would not be able to do so with impunity. In the end it was Herr Hitler, not Mr. Chamberlain, who had to give way over what was the prime essential, that Germany should not overrun Czechoslovakia by force of arms and thereby start a World war.

For the Services it has at least provided a " dress rehearsal " which has been invaluable. For the nation as a whole it must be regarded as one last chance to put its defences in order as speedily as possible, especially as regards the civil departments and commercial organizations. In every home there might well be hung that notice so familiar to the motorist when danger is still ahead :—

" You have been warned."

THE SPANISH CIVIL WAR

THE WAR ON LAND

THE completion of two years of war on 18th July, 1938, formed the occasion for reaffirmations from both sides of the will to fight to a finish. Señor del Vayo—the Republican Foreign Minister, broadcasting from Barcelona, declared that " Republican Spain is entering on the third year of the war with something more than confidence in victory, with the decision to struggle until the end, until the last man, for the last piece of Spanish soil."

From Valladolid, General Franco, who had appointed himself Captain-General on 18th July, announced that during the past twelve months his troops had liberated 3,000,000 Spaniards from the Government yoke and emphasized that the war was " a crusade against Communist invasion."

The war map seems to indicate that, from a territorial point of view, the odds are now heavily in favour of the Nationalists : only about one-third of the total area of Spain remains in the hands of the Government, who control but nine provinces out of fifty. The Balearic Islands—except for Minorca—Spanish Morocco, the Canary Islands, Spanish West Africa and Spanish Guinea are all Nationalist. Of the twenty-three million inhabitants, more than fourteen million are under Nationalist rule. On the other hand, the three largest cities—Madrid, Barcelona, and Valencia, remain in Government hands.

On 25th July the Republican troops in Catalonia launched an offensive aimed at relieving the Nationalist pressure on Sagunto and Valencia, and crossed the River Ebro. The attack, which came as a surprise to the Nationalists, carried the Republicans to the outskirts of Gandesa ; but there they were held up.

In accordance with his policy of never relinquishing territory which he bas captured, General Franco assembled strong reinforcements, drawn chiefly from the Sagunto front, and on 7th August delivered a fierce counter-offensive. Some progress was made in the face of stubborn

opposition from the Republican troops who, although outgunned and outnumbered in the air, resisted most gallantly. Heavy losses in killed, wounded and prisoners were incurred by both sides. In the meantime, the Nationalist offensive against Sagunto had to be suspended.

On 14th August the Republicans counter-attacked along the River Segre between Lerida and Balaguer, but progress was checked after some small territorial gains.

On the Estremadura front, a Nationalist Corps under General de Llano commenced a drive towards the Almaden mercury mines, reputed to be the richest in the world. With the arrival of Government reinforcements in this area the Nationalist forces were checked and, on 25th August, were reported to have effected a considerable retreat.

During the period 4th–6th September the Nationalist counter-offensive on the Ebro made progress and, after heavy fighting in the Gandesa salient, secured the whole of the Siena de Caballo, overlooking the Ebro. The Republicans admitted withdrawal from some points on this front, but claimed to have inflicted very heavy losses on the enemy. Further Nationalist attacks launched on 16th September on the Gandesa salient broke down, and after forty days of continuous fighting a deadlock seemed to have been reached in this sector.

On 22nd September, General Franco brought up some of his best troops from Army reserve and threw them in on the Ebro front; their gains, however, were slight and the price paid was high.

Further Nationalist attacks made on 3rd October secured some tactical points of minor significance.

The Spanish Government announced their decision to dispense with the services of all foreigners in the Army and withdrew the 15th (International) Brigade, including the British battalion, which had been in the line near Gandesa.

THE WAR IN THE AIR

During the past quarter the chief feature of the war in the air has been the increased emphasis laid by Italy upon the exploits of the so-called " Legionary Aviation of the Balearics " and the strong rumours of additional aerial support to General Franco.

On 12th July an official *communiqué* issued in Rome stated that 120 Italian airmen had been killed in Spain since the beginning of the war, and 21 had been taken prisoner; the Italians also claimed to have brought down 580 Republican aircraft, including 69 bombers, mostly of French and American types.

During the fighting on 24th July on the general line Segorbe–Sagunto, General Franco is reported to have concentrated 100 German and 400 Italian aircraft on a 20-mile front and to have subjected the Republicans holding that sector to an intense air bombardment.

In General Franco's counter-attacks on the Lower Ebro between 25th July and 5th August, 541 Italian airmen are announced to have taken part in 158 raids. The Republicans claimed to have brought down 5 insurgent aircraft (4 Fiats and one seaplane) in aerial combats.

Insurgent aeroplanes also bombed Alicante on 6th August, inflicting 26 casualties, one of whom was Mr. Callegon—British Consular Agent, dangerously wounded.

After further aerial combats the Republicans claimed, on 14th August, to have shot down eighteen Nationalist machines, including thirteen Fiats.

According to reliable reports, cases have occurred where Italian aircraft flying from a base in Italy have landed at Majorca, picked up a load of bombs and then dropped them on Spanish sea-coast towns. On the completion of the "exploit" the aircraft are alleged to have flown back to Italy.

On 1st September the British Commission for the investigation of aerial bombing issued its first report dealing with 46 raids on Alicante and with raids on Barcelona, Sitges and Torrevieja.

It found that of the 46 raids 5 were deliberate attacks on the civilian population, resulting in the deaths of 290 and the injuring of 295 civilians. The remainder were described as attempts to hit the port area or the railway stations. The raid on Barcelona on 19th August was probably "a very badly aimed attack on the port area conducted by an unskilled squadron. No military objectives were located in the area hit." The raid on 25th August on Torrevieja constituted "a deliberate attack on a defenceless civil population." The attack, which was delivered at low altitude in perfect weather conditions, could not, in the view of the Committee, have been made by mistake.

Further Nationalist air raids were reported on Mediterranean seaport towns: on 30th September, Alicante was bombed by five Savoia 81 machines, which dropped ten very heavy bombs, injuring fifteen people; Barcelona was raided on the night of 3rd October five times by a single seaplane; this machine was shot down over the sea by Government aircraft; and on 4th October, Valencia suffered three raids in one night, when thirty bombs were dropped; the casualties, however, were slight.

THE SINO-JAPANESE WAR

THE first anniversary of the Sino-Japanese conflict was signalled on 7th July, 1938. From a territorial point of view, the Japanese forces have acquired immense gains and are in nominal control of one-third of China—300,000 square miles with an estimated population of 130,000,000.

The effective control of the Japanese troops, however, varies with the particular district, and in many places, owing to the activities of the Chinese guerillas, whose operations are extremely harassing, the garrisons are confined to their defended localities.

The casualties on both sides have been immense; the Chinese are reported to have lost 450,000 soldiers killed and 850,000 wounded, while Japanese casualties are estimated roundly at 90,000 killed and 200,000 wounded. Chinese civilian casualties cannot be estimated, but the number of refugees exceeds 1,000,000 and many more have died of famine, flood and disease.

The end of the conflict, however, is not yet in sight. Marshal Chiang-kai-Shek has declared that he is not at all dissatisfied at the general progress of the war and that his troops are steadily maintaining their objective, which is to kill or maim as many Japanese as possible. "If we can kill even one Japanese for every four or five of our men," affirmed the Marshal, "we shall win the war." The Japanese War Minister—Lieutenant-General Itagaki, for his part, has asserted that Japan has made preparations to fight for ten years, if necessary.

The Japanese advance up the Yangtze having been resumed on 3rd July, the Matung boom defences were forced by a combined naval and military operation. The Chinese, however, constructed another boom near Hukow, just below Kiukiang at the junction of Lake Poyang and the Yangtze.

After this success, the Japanese ordered a short halt to consolidate their positions and to prepare for the further advance. On 21st July, Japanese reinforcements were reported to be moving up the Yangtze at the rate of 5000 men a day, and large numbers were concentrated near Hukow.

Fierce fighting took place on 23rd July and subsequent dates, and on 26th July the Chinese withdrew from Kiukiang after admitting "the complete destruction of our shore fortifications and the holy sacrifice of all our men." The Japanese offensive was continued along two main lines, one by land westwards from Anking and the other by water up the Yangtze. Severe fighting went on throughout August without any decisive result and the Chinese resistance proved extremely stubborn.

On 8th August, the Chinese claimed a successful counter-stroke against the 6th (Japanese) Division near Taihu, North of Kiukiang, where the Japanese are said to have lost 6000 men.

About this time repeated rumours of the use of gas by the Japanese were reported, and later the Chinese authorities lodged a protest with the League of Nations on this subject. These rumours may well prove to be true as the Japanese were, at this time, seriously concerned at their slow rate of progress ; their military time-table was several weeks behind schedule, and the season for the lowering of the level in the Kangtse River was not far distant ; the river, at its lowest, would form a severe handicap to the operations of naval craft and of supply vessels.

On 21st August the Japanese made a fresh and successful landing on the West shores of Poyang Lake. The Chinese, however, on 7th September, reported that they had retaken Singtze, on the western shore of the entrance to the lake and were also engaging the Japanese on the South bank of the Yangtze at points just above Wuhu and below Kiukiang.

Japanese columns were reported to be making progress westwards in Honan towards the Peking–Hankow railway with a view to cutting the line North of Hankow and severing communications between the Chinese forces round Hankow and those engaged along the Yellow River. The Japanese columns in Honan continued to make progress and, on 18th September, claimed the capture of Shangcheng, about eighty miles East of the Peking–Hankow railway. Two days later the important town of Kwangchow, North-West of Shangcheng, fell into Japanese hands and, on 22nd September, Loshan—a road junction some thirty miles East of the railway, was captured.

On 14th September, the Japanese announced the capture of the second series of boom defences near Hukow, where extremely heavy losses are reported to have been incurred by both sides. By 30th September, Japanese naval forces were advancing up the Yangtze about eighty miles from Hankow and were removing boom defences and sweeping mine-fields.

According to Japanese reports, the Chinese, in the fighting about Kwangtsi (Yangtze River sector), during the period 20th August to 17th September, left 47,000 dead on the field and suffered further losses of 1200 prisoners, 10 field guns, 11 mountain guns and 201 machine guns. Further Chinese losses in the battle of Tienchiachen, ending about 2nd October, were estimated at 5000 killed, 25,000 wounded, 500 prisoners, 2 field guns and 68 machine guns. Japanese losses were not stated but, as the Chinese troops fought most stubbornly, are believed to be heavy.

THE WAR IN THE AIR

On 3rd July, ten Chinese bombers raided Anking, but according to Japanese reports, all were shot down ; the pilots were, it is claimed, all Soviet airmen. The Chinese claimed to have sunk an aircraft carrier and two destroyers near Anking ; but this is denied by the Japanese naval authorities.

Nanchang was heavily raided on 4th July by fifty Japanese aircraft and an air battle took place in which the Japanese claimed to have destroyed fifty-four Chinese machines with a loss to themselves of only one.

In conjunction with their military offensive up the Yangtze, Japanese bombers on 19th July raided Hankow and killed and wounded several hundred civilian inhabitants ; Chinese defence lines just below Kiukiang were also heavily bombed.

On 3rd August, a fierce air combat took place over Hankow, where the Chinese claimed to have shot down twelve Japanese machines with a loss to themselves of six only. Japanese reports, however, claimed the destruction of thirty-two Chinese aircraft. Further air fighting took place over Hankow on 6th August, when the Japanese claimed to have destroyed an aerodrome and eight Chinese aircraft.

Japanese bombers made further heavy raids on 16th August against the Hankow–Wuchang–Hanyang triangle, and were met by Chinese fighters with heavy losses claimed on both sides. Shortly afterwards Hankow was stated to be isolated owing to damage to the railroad by aerial bombs and to the suspension of the Chinese civil aviation groups—the Eurasia Company and the China National Aviation Company.

Two hundred Japanese aircraft were reported in action on 2nd September above Teian, North of Kiukiang, where they co-operated with a land column which was operating on the North bank of the river ; 15,000 Chinese soldiers are estimated to have been killed.

Foreign interests were again involved on 24th August, when a squadron of Japanese aircraft machine-gunned and forced down a Chinese-American air liner near Macao *en route* from Hong-Kong to Wuchow, with the loss of fourteen out of the seventeen passengers and crew on board. The Japanese, it appears, had hoped to kill Dr. Sun Fo —President of the Legislative Tuan, who had booked a passage on the aircraft but had changed his mind at the last moment and travelled on another machine.

The American Government despatched a firm note of protest to Tokyo at this fresh outrage, which was termed as an "unwarranted attack." The Japanese Government, however, rejected this note on

the grounds that " the company to which the aeroplane belonged being a Chinese juridical person, the incident is not one which involves Japan directly with any third Power." Regret was expressed over the danger to which the life of the American pilot had been exposed, but the Japanese authorities took the view that the action of their aeroplanes was not unwarranted in the circumstances.

Later another air liner, of the Sino-German Eurasia Co., was shot down near Hankow; the pilot and others on board being Chinese.

The American Baptist hospital at Wuchow, which was flying the U.S. flag on the building, was severely bombed by Japanese aircraft, and several persons were killed.

In conjunction with the advance of their land forces against the Peking–Hankow railway, Japanese aircraft raided Sinyang station on 21st September and caused severe damage to trucks loaded with troops and munitions. Shortly afterwards Japanese machines bombed the Catholic Mission Hospital and school at Sinyang, killing five civilians.

During the period 26th–30th September Japanese air forces displayed great activity: forty-seven machines raided the Chinese communications North and South of Hankow; and two hundred aircraft heavily bombed Chinese troops in retreat on the Yangtze front near Kichun, killing large numbers.

THE MANCHUKUO FRONTIER INCIDENT

SEVERE tension, accompanied by actual hostilities, developed on the South-Eastern border of Manchukuo when, in July, Soviet troops crossed the Manchukuo frontier near the coast and occupied Changkufeng, a hill of considerable tactical importance overlooking the Japanese port of Rashin.

In reply to Japanese protests, the Soviet Government declared that the disputed hill was in Soviet territory. After further parleys, which were abortive, the Japanese, on 29th July, attacked the Russian positions in the Changkufeng area and restored the *status quo* that had existed before the Soviet advance. Two days later, according to Japanese reports, the Russians counter-attacked in force and were repulsed with a loss of 200 men with some tanks and artillery. Moscow, on the other hand, announced that the Japanese had been evicted from the hill with a loss of 400 men.

These incidents were followed on 2nd August by the bombing by Soviet aeroplanes of the Korean village of Kojo. Since the Soviet air bases near Vladivostock are only about 500 miles from the heart of Japan, this preliminary air action aroused considerable anxiety and

extensive preparations were made for a " black-out " of Central and Eastern Japan in the event of an air raid.

Meanwhile negotiations were being energetically pursued between Tokyo and Moscow. Japan offered, on 4th August, to withdraw her troops from the disputed hill provided that the Soviet would do the same. M. Litvinoff—the Soviet Foreign Minister, however, declined to entertain this offer and declared that " the Soviet Union will never tolerate the presence of foreign troops on any part of its soil." He also demanded that " the Japanese Government must respect Soviet borders on the basis of the map attached to the Sino-Russian Treaty of 1868." The Japanese Ambassador, for his part, disclaimed all knowledge of the map in question and said that the Treaty could be reserved for future discussion.

Further fighting broke out on 6th August, and twenty-five Soviet aircraft raided the Tumen–Rashin railway; the Japanese claimed to have shot down two of the machines. After a short lull hostilities were resumed on an increased scale; Soviet attacks were launched on a wide front and heavy casualties were incurred on both sides.

After conferences between M. Litvinoff and M. Shigemitsu—Japanese Ambassador to the U.S.S.R., a truce was arranged and hostilities were terminated as from noon on 11th August.

Japanese official estimates of the casualties on both sides are: Japanese killed, 158; wounded, 723; Russians killed and wounded, over 1700.

Soviet official figures give: Russians killed, 236; wounded, 611; Japanese killed, 600; wounded, 2500.

The result—though possibly not the intention—of these hostilities has been to pin the Japanese forces in Manchukuo to their ground and to prevent any important fraction of them being transferred to the Chinese Yangtze front.

CORRESPONDENCE

[*Correspondence is invited on subjects which have been dealt with in the* JOURNAL, *or which are of general interest to the Services. Correspondents are requested to put their views as concisely as possible, but publication of letters will be dependent on the space available in each number of the* JOURNAL.—EDITOR.]

THE LEGALITY OF AERIAL BOMBARDMENT

TO THE EDITOR OF THE R.U.S.I. JOURNAL.

SIR,—I have read with deep interest Mr. Philip A. Landon's paper on "The Legality of Aerial Bombardment" in the JOURNAL for August. It is all to the good when a distinguished scholar and lawyer addresses his mind to this important subject, and with much that Mr. Landon says I am in agreement. There are, however, in his paper some propositions (numbered (1) to (4) below) which seem to me to be distinctly open to challenge.

(1) Mr. Landon lays down the two fundamental principles, or two aspects of the same principle, that "war is between the fighting forces and not between the civilian populations," and that "the lives and security of non-combatants are sacrosanct." "International law," he says later, "has always held that the lives of non-combatants are sacrosanct." On this two-fold principle he bases his argument that "no form of aerial attack is lawful outside the sphere where the fighting troops are engaged." (In that sphere civilians must take their chance.)

He cites Oppenheim in support of the principle affirmed, but not the latter's further statement (p. 116) that non-combatants are "exposed to all injuries indirectly resulting from the operations of war." W. E. Hall uses almost the same words; "though non-combatants are protected," he says, "from direct injury, they are exposed to all the personal injuries indirectly resulting from military and naval operations directed against the armed forces of the State." Other jurists could be quoted to the same effect. This liability to *indirect* injury is an important derogation from the civilian's right to personal immunity; and it is a liability which exists outside the sphere in which fighting troops are engaged, e.g. in an *undefended* port raided by enemy cruisers.

(2) Hague Convention No. IX of 1907, on Naval Bombardment, says Mr. Landon, "carries with it, *sub silentio*, the slight suggestion that such a bombardment could be carried out even though it might inflict loss of life upon the civilian population; but, in the better view, such was not the intention of the rule."

I submit that it *was* the intention. The Comité de Rédaction which drafted Article 2 of the Convention say in their report: "Les dommages involontaires causés par le bombardement en dehors de ces limites [i.e. the specified objectives]

seront supportés par les habitants des villes bombardées, sans qu'il puisse en resulter une responsabilité pour le commandant des forces navales" (Blue Book Miscellaneous No. 4 of 1908, Cd. 4081). In other words, it was recognized that shells aimed at the permitted objectives might miss their mark; in that event, civilians might be injured or killed unintentionally, but the bombardment was not thereby rendered unlawful. Nor could the civilians in question be considered to have exposed themselves to the risks of war, for they would be, *ex hypothesi*, in their accustomed place in an undefended port, far, perhaps, from any theatre of war.

(3) "Hague Convention No. IX," says Mr. Landon, "declares that the naval commander must, before resorting to the bombardment of the military objectives, give warning to the local authorities."

He may omit the warning, it is expressly provided in the Convention, "if, for military reasons, immediate action is necessary." An example of a case in which omission of warning and delay would be justifiable is that in which ships of war are in the harbour and might rejoin their fleet unless shelled at once. To this example, which is given in the report of the Comité de Rédaction, may be added that of the approach of the hostile fleet to cut off the raiding cruisers. The omission of warning, says Dr. Schleicher in Strupp's *Wörterbuch des Volkevrechts*, could be claimed as necessary with equal justification in air bombardment.

(4) "The conception of a 'zone of operations' is a familiar one," says Mr. Landon, "both in literature and in conventions, and we must give the Germans the credit of having always advocated that aeroplanes should not be used beyond that zone, except for reconnaissance. Only two years ago, in 1935 and 1936, Hitler went out of his way to express the hope that the German view on this issue would be adopted by the other nations."

Herr Hitler's proposal was that the dropping of bombs on *open localities* outside the range of the medium artillery of the fighting fronts should be prohibited; not that all bombing outside that zone should be prohibited. What "open localities" meant was not made clear. It is doubtful whether the formula would preclude bombing of barracks, naval dockyards, arsenals or military aerodromes. I suggest that Mr. Landon is reading more into the German offer than was really in it. At the same time it is true, as he says, that our own Government has declared itself ready to give up bombing altogether (even in a battle zone) if other States would agree.

I am inclined to agree with Mr. Landon's view that "there is absolutely no safeguard for innocent life in the conceptions of the 'defended place' and the 'military objective.'" The sterility of the latter conception, however, is mainly due to the fact that "military objective" has never been authoritatively defined. Air Commodore Brock's questions about its meaning, in the discussion following Mr. Landon's paper, were very much to the point. If "military objective" were defined, and the rule agreed to was observed, there might be some safeguard in it; at least, the position would be better than it is at present.

May I end on a personal note? Mr. Landon quoted from my *Air Power and War Rights*, and I am grateful to him for his generous references to me; but it was from the first edition (1924) that he quoted, whereas in the second (1933) I modified some of my earlier views. I would not now set such store by the argument relating to devastation.

J. M. SPAIGHT.

27th August, 1938.

FIRE SUPPORT FROM THE AIR

To the Editor of the R.U.S.I. Journal.

Sir,—The editorial footnotes to Colonel Everett's article on "Fire Support from the Air" (p. 591 of the August Journal) have the appearance of official comments, and therefore deserve attention.

In one you state: "We are given to understand that it is not considered feasible that aircraft and ground troops should be under one command in the attack on a tactical objective."

In the next you say: "We are given to understand that the use of radio-telephony and wireless now makes the control of aircraft, even after they have been launched, a simple matter."

The first statement appears to ignore the generally accepted principle that, while close co-operation may suffice in strategy, unity of command should always be aimed at in tactics.

The second statement appears to discount the assertion contained in the first. If the control of aircraft by radio-telephony and wireless is a simple matter, unity of command of ground troops and air forces engaged in the same tactical operation would appear to be quite feasible as well as desirable, especially now that mechanized forces are controlled by the similar means.

"Observer."

To the Editor of the R.U.S.I. Journal.

Sir,—Referring to the article on "Fire Support from the Air" in the August number of the Journal, it does not seem to me that it will be possible to carry out an effective machine-gunning of trenches, because the high speed of the aircraft will cause an undue dispersion of the bullets.

To take a simple instance, if an aeroplane flies level along a trench for one minute at 240 m.p.h., it will cover 4 miles. If one machine gun was firing continuously at 300 rounds per minute there would be a bullet striking the ground approximately every 23 yards. An addition of three or four guns would not materially increase the density of the beaten zone.

"Fusilier."

To the Editor of the R.U.S.I. Journal.

Sir,—Since contributing my article on "Fire Support from the Air," which I understand is appearing in the November Journal, an article has appeared in *The Times* of the 8th October last entitled "On the Ebro—The Republican Resistance." In this it is stated that the Republican command has estimated that in that area the Nationalists dropped an average of 10,000 bombs a day during the first five weeks on bridges and positions; the total weight of bombs being some 3,000 tons of explosive. It is further claimed that only one in every 3,000 bombs made a direct hit, and even when this was secured the damage could be repaired after nightfall. "Trench bombing," says the article, "apparently proved equally ineffective. Machine-gunning from the air proves effective on concentrations or in the open. To employ it on trench systems, unless in actual moment of attack, is sheer waste. The general conclusion is that in field operations air attack in the mass is not yet deadly except on specific or bulky objectives."

"Hawai Jehaz."

Havant, Hants.
8th October, 1938.

THE FUTURE OF THE AIRSHIP IN IMPERIAL COMMUNICATIONS

To the Editor of the R.U.S.I. Journal.

Sir,—Lord Ventry, defending the airship in the Journal of last May, seems to employ some misleading arguments.

On page 263, comparing the speeds of airships and aeroplanes over Imperial routes, his airship times (quoted from Air Commodore Maitland) appear to be based on a steady "point to point" speed of nearly 50 m.p.h. To run a regular time-table based on his figures would necessitate a cruising speed of at least 75 m.p.h. to allow for head winds, detours, etc. He compares them with an Imperial Airways time-table which is already out of date in certain respects, and which should be speeded up 100 per cent. by the time any airship service could be put into effect.

In the next paragraph he states that the average time from Ireland to New York during the experimental flights last year was 89 hours. The experiments in question were carried out between Ireland and Botwood, Newfoundland. The average time put up by the "C" class flying boats was about 12 hours for the West-East crossing, and about 15 hours for the journey in the reverse direction.

On page 269: "When flying from Friedrichshafen to London on one occasion the 'Graf Zeppelin' was rarely flying at a greater height than 700 feet . . ." I suggest that this should read "700 metres."

Few will deny that a case can be made out for the use of airships for certain purposes and by nations assured of a supply of helium. But your contributor was, I think, inclined to overstate the case.

G. N. Beaumont,
Lieutenant, R.N.

H.M.S. "Eagle,"
China Station.
11th June, 1938.

GENERAL SERVICE NOTES

THE COAST DEFENCE EXERCISE OF JULY, 1938

The problem of Coast Defence is not an easy one to investigate since it requires not only the co-operation of all three Services, which often cannot conveniently be arranged owing to other commitments, but also the assistance of a number of units which are not composed of full-time professional fighters, e.g. Retired Officers, Territorials, Coastguards, Reserves, and so on. Particular interest therefore attaches to the large-scale operations carried out by the three Services between the 19th and 23rd July.

The object of this exercise was to try out the shore defences of certain of the East Coast Ports, the Thames–Medway Estuary, Harwich, the Tyne, and the Forth, and to test in the process the organization of the three Services and their co-ordination for meeting sea-borne and air attacks in these areas.

The Rival Forces

The forces were divided as follows :—

BLUE (the Attackers).

Naval. Four battleships, four cruisers, and fourteen destroyers of the Home Fleet, and five submarines.

Air. A representative force of five squadrons working from H.M.S. "COURAGEOUS."

RED (the Defenders).

Naval. Two cruisers and four destroyers, representing a force of equal strength to that of the BLUE fleet.

Military. Territorial Royal Artillery and Royal Engineer Units at the Tyne, Forth, Thames, Medway and Harwich fortresses.

Air. Eight general reconnaissance squadrons (three of which were flying boat squadrons and the remainder ANSONS).

One torpedo bomber squadron (VILDEBEEST IV).

Four fighter squadrons (2 GAUNTLET, 1 GLADIATOR, and 1 HURRICANE).

Six Coastal Co-operation Artillery aircraft.

These squadrons were worked from the various aerodromes appropriate to the operations in progress.

In addition to the normal port-defence personnel, the coast-watching organization was operating in certain districts. At the various defended ports the Examination Service was in operation, and this as well as the harbours was protected by the local fortress guns, manned by Territorials.

Another interesting feature of the exercise was the large-scale co-operation provided by the Post Office in the matter of telephonic and telegraphic communication. This was on so extensive a basis that the public had to be warned to expect some dislocation of the normal services.

Narrative of the Exercise

Conditions were made as realistic as possible, although in order to exercise the defences the attacking surface vessels had to carry out operations which were certainly not of the type that they would undertake in war. The defence, on the other hand, had only two cruisers and four destroyers to represent a complete battle fleet; this operated in their favour at times as a single ship, instead of, say, four battleships with attendant light craft, was naturally able to move with greater freedom than would the force which she represented. Apart from these limitations the exercise did reproduce actual service conditions to a considerable extent.

It started at midnight on the 19th–20th July, but at 8 p.m. on the 19th the Red Senior Officers were informed that unusual activity had been noticed amongst ships of the Blue fleet, and that none of them could be traced as being in harbour. This was followed at midnight by a declaration of war, which in fact found all Red forces, both afloat and ashore, in their assigned positions.

The Initial Air Attacks

Blue did not wait long to make his presence felt, and the first dawn brought the sounds of enemy aircraft to Rosyth, Montrose, Leuchars and Thornaby. Each of these places was subjected to heavy attacks. These were unhindered; but it has to be remembered that the anti-aircraft defences were not in action, and the fact that they were launched from a carrier at no great distance from the objectives allowed a scale of attack to be maintained which would have been difficult in war. On the other hand, the Blue air force was only a skeleton one. At Rosyth the attacking aircraft unwisely flew over units of the fleet which were in harbour, forgetting perhaps what a formidable addition to the anti-aircraft defences of a port may be provided by ships' guns.

These attacks served to bring home what one might call the sudden onslaught of modern war. Up to the present, so far as our own shores have been concerned, it has been many weeks after a declaration of war before there has been actual physical contact with the enemy, and we have had invaluable time in which to make good some of the deficiencies of our defences. This exercise showed that in a future war the high command may find itself subjected to the maximum of disorganization within an hour or two of the expiry of the final ultimatum. This may be appreciated well enough in theory, but it is brought home vividly by the deafening noise of a squadron of attacking aircraft just overhead.

Naval Activities

Meanwhile Red air forces had been developing their reconnaissance. At first conditions were not good and surface craft remained undetected, but by 7 a.m. a Blue cruiser was located.

The next reports of Blue activity were a series of calls from merchant vessels attacked by submarines. (This was represented by submarines on patrol making dummy attacks on merchantmen and then surfacing and making a call for help as though emanating from the merchant ship concerned.) These reports soon enabled the Red command to realize that there was a concentration of submarines off the coast of Yorkshire, and early in the morning local patrols sighted a submarine off the Tyne.

By noon Red was beginning to feel anxious at the lack of news of the Blue fleet, as so far only the cruiser escaping to the northward had been reported. How-

ever, at 2 p.m. the BLUE battle fleet was sighted by reconnaissance aircraft some 150 miles East of the Tyne and making for the coast. This put RED in a much more satisfactory position, as there was every hope that if the BLUE battle fleet were kept under observation the RED fleet, by now at sea, could intercept and bring BLUE to action. There were still, however, two cruisers and three destroyers unlocated, and the whereabouts of these was the cause of some speculation coupled with the fear that they might have evaded the patrols and would make their presence known by an unexpected descent on the coast. This was not in fact fair to the reconnaissance, as at 8.20 p.m. the missing ships were sighted 75 miles to the eastward of Lowestoft, and thus by the close of the first full day RED had a complete picture of the position and movements of the whole of the BLUE surface forces.

This juncture in the narrative provided perhaps the most instructive moment in the exercise: not only had BLUE been sighted, but his fleet was kept under continual observation and every movement of it was known to the RED fleet, which was able to bring BLUE to action with a superior force at 7.45 p.m. whilst there still remained two hours of daylight. The naval problem had thus been solved. One is irresistibly drawn to comparison with Jutland. There the Commander-in-Chief was battling with uncertainty and contradictory information. How different it might have been if aircraft had been generally employed and able to indicate the precise position of our battle cruisers relative to the "Iron Duke," or if Admiral Jellicoe could have had the exact placing of every unit of the High Seas Fleet! In this case, the RED fleet was at sea with sufficiently early and reasonably certain information, to enable it to intercept the enemy and join action under favourable conditions. That such results might be achieved, given good air reconnaissance, is of course obvious, but it is instructive to see the outcome under practical conditions in the very area where Jutland was fought.

There is another comparison with Jutland which, perhaps, is not so satisfactory. The main action would not actually have been joined until after 7.45 p.m., and, as at Jutland, the time remaining in which to defeat the enemy would have been perilously short. Indeed it seems questionable whether the descent of darkness would not, as before, have allowed an enemy fleet to make good its escape. Nevertheless, the fact that air reconnaissance did succeed in finding and keeping under observation the whole of the enemy naval forces within eighteen hours of the declaration of war must greatly relieve the anxieties of the defence. Evidently it is only a matter of having more aircraft available to reduce the interval so that, given visibility, it will be possible to locate an enemy fleet in time for contact to be made earlier in the day. Ultimately, perhaps, the period between nightfall and dawn will be too short to enable him to reach the coast under cover of darkness and to deliver his attack before he is discovered from the air.

PHASE II

COAST ATTACKS

After the fleet action off the Tyne, the Directing Staff stopped the exercise, as the strategical aspect had come to an end. The fleets were ordered to separate, and BLUE was left more or less untrammelled to develop his coastal attacks and thus to carry out the second object of the operations—the training of the coast-defence personnel.

Just before dawn on 21st July reports started to come in from the coast watchers of the approach of enemy battleships and light craft in the vicinity of St. Abb's

Head. Shortly afterwards a BLUE battleship and four destroyers entered the Firth of Forth and, after an action with the local defence flotilla, proceeded up past May Island nearly to Inchkeith, thus giving plenty of practice to the local garrisons of the fortress guns. The squadron then withdrew, and, as no casualties were imposed, all concerned lived to fight another day. Almost simultaneously reports came through from the Tyne that they were being heavily attacked by two battleships.

At dawn, air reconnaissance had been resumed; but now conditions were no longer favourable and the situation rapidly became very different from the point of view of the defenders. Instead of the comfortable certainty of the position and movements of the BLUE fleet, there was a veil over the scene affording an interesting contrast to the conditions of the previous day, and all reports spoke of the bad visibility. The attacks by BLUE battleships had, however, drawn the RED fleet North, and it was able to intercept and engage two of the enemy. After this the RED fleet turned South in pursuit of the battleships attacking the Tyne, but the Directing Staff intervened and sent RED back into harbour.

The situation now became interesting, for the poor visibility put the clock back twenty years: the fleet commanders were deprived of all the comforts of efficient air reconnaissance and found that they had to rely on the efforts of their surface light craft. In this respect RED was badly placed: on paper he had ample light craft, but in fact he had only four destroyers to provide him with information, and these could not, of course, cover the area which theoretically he could have searched.

A renewal of air reconnaissance at 6 p.m. was more successful than that of the early morning, and before dark several units of the BLUE fleet were sighted, although RED was not in possession of all the information that was desired. As a result of such information as was received by nightfall, RED decided that BLUE had split into two forces, one of which would probably attack the Thames Estuary, and the other the coast further North. RED forces were therefore sent to sea at 10.30 p.m., but no contact was made that night.

Daylight found both fleets at sea, with RED seeking to intercept BLUE and to ward off his attacks on the coast. As RED had only sailed at 10.30 the night before there was little hope of achieving the latter object, and whilst he was making a fast passage South, Chatham was attacked by aircraft at 5.45 a.m. RED located two cruisers about 150 miles from Peterhead, and at 9.30 a.m. the position of the BLUE forces had been established in the south-eastern portion of the North Sea. As, from these reports, it seemed likely that only one battleship and one cruiser and some destroyers were standing to the Northward, RED continued to head southward in pursuit of BLUE main body, which was evidently making for the Thames.

The weather having cleared, air reconnaissance throughout the day kept BLUE under close observation. By 5 p.m. RED forces were within 60 miles of the Thames, and at 6.30 p.m. light forces were in contact. At 10.15 p.m., once again perilously near the close of day, the fleets would have been in action had not RED been called off as the exercise was not intended to be one in fleet tactics.

ATTACKS ON THE NORE COMMAND

BLUE was once again, therefore, able to carry out his attack unmolested except for the resistance of the local forces. There is little besides matters of technical interest to report about these raids. They were pressed well home and thus gave the defenders full opportunity of engaging men-of-war targets; but it must be emphasized once again that BLUE heavy ships were acting in a way that would not

have been practicable in war. It is not to be expected that battleships will operate in enemy waters, where they would be subjected to close-range air, surface, underwater and shore attack: yet the defence must be prepared to meet sporadic attacks of the nature which occurred at East Coast ports during the War.

Light craft having attacked close in to the local defences supported by heavy ship bombardment, the exercise was finally concluded at 10 p.m. on 22nd July.

Work of Local Forces

As has been stated, the Territorial units manning the fortresses were afforded naval targets during the exercise, and one of its valuable results was that it brought into smooth operation the co-ordinated organization of all three Services for the protection of the ports from raiding attack, and also the organization for the examination of vessels entering and leaving those ports. Certain ships were detailed to act as unfriendly neutrals, and the whole system of examination and search was carried out so as to give experience to all concerned. Similarly valuable experience was gained in the reporting of vessels passing and approaching our coasts by the personnel engaged in look-out duties.

Local defence craft had their opportunity to attack the raiding forces and were familiarized also with their duties on patrol. Attack by motor torpedo boats was also a feature in this exercise, and their use adds another serious menace to raiding forces.

CONCLUSION

It has only been possible to summarize the principal features of this exercise, but it is hoped that enough has been said to bring out the main lessons of the occasion. These lessons, although they are not new, are none the worse for being emphasized in practice.

The fact that efficient modern reconnaissance has made the attackers' problem so much more difficult produces the paradox that the development of aircraft has tended to enhance rather than diminish the insularity of this country so far as invasion or sea-bombardments are concerned, since to cross the dividing waters has become more than ever a hazardous operation of war. An enemy's chances would, however, be improved by weather which made air reconnaissance impossible; therefore the naval task of finding, holding, and finally destroying a hostile fleet remains as important as ever, in fact it may be said to have gained in importance because, when sea reconnaissance has to be substituted for that of the air, the need for information will be most vital.

NAVY NOTES

GREAT BRITAIN

Cruises by Their Majesties

On the occasion of their State Visit to France, the King and Queen travelled from Dover to Boulogne on 19th July in H.M.S. " Enchantress," Admiralty yacht, to which Vice-Admiral Sir Dudley North, Commanding H.M. Yachts, transferred his flag in command. They were escorted by the flotilla leader " Exmouth," Captain L. Vaughan Morgan, and the destroyers of the 5th Flotilla. They returned in the " Enchantress " with the same escort on 22nd July.

The Queen, accompanied by Princess Elizabeth and Princess Margaret, embarked in the Royal Yacht " Victoria and Albert " at Portsmouth on 26th July. They were joined two days later by the King, and the Yacht proceeded to Cowes for Regatta Week. On 1st August, the " Victoria and Albert " anchored off Southwold, where the King was rowed ashore next day to visit the camp for public school boys and young workers which he founded in 1920. Escorted by the destroyer " Boreas," Commander J. W. M. Eaton, the Yacht cruised up the East Coast to Aberdeen, where the Royal party disembarked on 4th August to go to Balmoral.

First Lord

Cruise.—During the Parliamentary recess the First Lord, Mr. Duff Cooper, M.P., visited Baltic ports in the Admiralty yacht ".Enchantress." He was at Kiel from 5th to 7th August, Gdynia from 8th to 10th, Danzig from 10th to 12th, Helsingfors from 13th to 16th, Stockholm from 17th to 20th, and Copenhagen from 22nd to 27th, returning to Tilbury via Kiel on 30th August.

Resignation.—On 1st October Mr. Duff Cooper tendered his resignation from the office of First Lord of the Admiralty on the ground that he differed from the Cabinet in the matter of their foreign policy.

Mobilization of the Fleet

On 27th September the Admiralty announced that it had been decided to mobilize the Fleet, and on 28th the following Royal Proclamation was issued calling up naval reservists :—

(*a*) All men in the British Isles belonging to the Royal Fleet Reserve Class B are to proceed to their depots without waiting for individual summonses.

(*b*) Class B men allocated to submarine service are to proceed direct to Fort Blockhouse, Gosport. This order applies to members of the Royal Fleet Reserve Class B only.

(*c*) All other naval reservists and pensioners will receive individual summonses in the event of their services being required.

(*d*) Officers should await individual notice of appointment, which they will receive as soon as their services are required.

Flag Appointments

Nore Command.—The King has approved the appointment of Vice-Admiral Sir Studholme Brownrigg, K.B.E., C.B., D.S.O., to be Commander-in-Chief, The Nore, in succession to Admiral Sir Edward Evans, K.C.B., D.S.O., LL.D., to date 6th January, 1939.

Second-in-Command, Mediterranean.—Rear-Admiral Geoffrey Layton, C.B., D.S.O., assumed command of the Battle Cruiser Squadron in succession to Vice-Admiral A. B. Cunningham, C.B., D.S.O., on 23rd August. From this date Vice-Admiral C. E. Kennedy-Purvis, C.B., Commanding First Cruiser Squadron, became Second-in-Command of the Mediterranean Fleet. On 19th September Vice-Admiral Kennedy-Purvis was succeeded in command of the First Cruiser Squadron by Rear-Admiral J. H. D. Cunningham, C.B., M.V.O., from which date Rear-Admiral Geoffrey Layton became Second-in-Command.

East Indies.—Vice-Admiral James F. Somerville, C.B., D.S.O., took over the command of the East Indies Station from Commodore Allan Poland, D.S.O., on 24th July, and hoisted his flag in H.M.S. " Norfolk " at Aden.

Royal Naval College.—The King has approved the appointment of Vice-Admiral Charles E. Kennedy-Purvis, C.B., to be President, R.N. College, Greenwich, and Vice-Admiral Commanding R.N. War College, in succession to Vice-Admiral Sir Sidney R. Bailey, K.B.E., C.B., D.S.O., to date 7th, October, 1938.

Imperial Defence College.—The King has approved the appointment of Vice-Admiral Thomas H. Binney, C.B., D.S.O., to be Commandant of the Imperial Defence College, in succession to Air Marshal Sir Arthur M. Longmore, K.C.B., D.S.O., to date 1st January, 1939.

Admiral Commanding Reserves.—Vice-Admiral Sir Noel F. Laurence, K.C.B., D.S.O., is to be Admiral Commanding Reserves in succession to Vice-Admiral Sir Studholme Brownrigg, K.B.E., C.B., D.S.O., to date 21st November, 1938.

Devonport Dockyard.—Rear-Admiral Arthur N. Dowding, C.B., has been appointed Admiral Superintendent, H.M. Dockyard, Devonport, in succession to Vice-Admiral Arthur L. Snagge, C.B., to date 27th September, 1938.

Rear-Admiral (S).—Rear-Admiral Bertram C. Watson, C.B., D.S.O., is to be Rear-Admiral (Submarines) in succession to Rear-Admiral Robert H. T. Raikes, C.B., C.V.O., D.S.O., to date 15th December, 1938.

Flag Promotions and Retirements

The half-yearly list of promotions to Flag rank under the new system adopted in 1937 was announced on 10th August, from which date the following were promoted to be Rear-Admirals in H.M. Fleet :—

Captain (Commodore First Class) Edward L. S. King, M.V.O., A.D.C.
Captain Arthur F. Pridham, A.D.C.
Captain (Commodore Second Class) William E. C. Tait, M.V.O., A.D.C.
Captain (Commodore Second Class) Alban T. B. Curteis, A.D.C.
Captain Philip E. Phillips, D.S.O., A.D.C.
Captain Denham M. T. Bedford, A.D.C.
Captain William P. Mark-Wardlaw, D.S.O., A.D.C.
Captain Ronald H. C. Hallifax, A.D.C.

The following officers were placed on the Retired List, to date 11th August, 1938 :—

Rear-Admiral Philip E. Phillips, D.S.O.
Rear-Admiral Denham M. T. Bedford.
Rear-Admiral William P. Mark-Wardlaw, D.S.O.

Rear-Admiral E. L. S. King was reappointed in his appointment as Chief of Staff, Home Fleet, on promotion.

Rear-Admiral Thomas F. P. Calvert, C.B., C.V.O., D.S.O. who was succeeded in command of the Second Cruiser Squadron, Home Fleet, in June by Rear-Admiral G. F. B. Edward-Collins, C.B., C.V.O., died on 1st July at King's College Hospital. He was born in 1883, entered the " Britannia " in 1898, and during the War served in the " Iron Duke," Grand Fleet flagship—of which he was senior Lieutenant-Commander at the Battle of Jutland, and in command of submarines. He had been Head of the Naval Air Section at the Admiralty, Director of the R.N. Staff College, and had commanded the aircraft-carrier " Pegasus," the cruiser " Frobisher " as Flag-Captain, and the battle-cruiser " Renown." From 1933 to 1935 he was Chief of Staff in the Home Fleet.

Personnel

Wearing of Aiguillettes.—The King has decided that aiguillettes are to be worn by Aides-de-Camp to the King, Honorary Physicians and Surgeons to the King, and Naval Equerries (including extra Naval Equerries) to the King on all occasions and with all dresses (except on the great coat or watch coat) when these officers are in attendance on His Majesty. Naval Equerries to Members of the Royal Family are to follow the same rule when in attendance on the Member of the Royal Family to whom they hold an appointment.

Officers' Pay and Service.—Alterations in the conditions of service of officers of the ranks of Commander and above were introduced with effect from 1st August, as the result of the recommendations of a Committee appointed by the Prime Minister, on which the three Defence Services were represented. The following is a summary of the changes :—

Provision allowance will be given to all officers of Captain's rank and below while on leave.

Officers who are temporarily unemployed for Service reasons through no fault of their own and who are to be further employed shall, if of Flag rank, receive the full pay of their rank and, if of Captain's rank or below, full pay and provision allowance and marriage alowance where applicable. Future Flag Officers, however, if their further employment is uncertain, will receive six months' full pay, six months at two-thirds pay, and thereafter half pay.

Senior officers (other than Admirals of the Fleet and General Officers, Royal Marines) will be placed on the Retired List when it becomes certain that they will not be further employed.

The practice whereby Rear-Admirals and Vice-Admirals get a step in rank to Vice-Admiral and Admiral and, though not employed in the rank thus reached, qualify for retired pay at the rate of the higher rank, is terminated. When this change becomes fully operative, retired pay scales for Flag Officers will be identical with those for General and Air officers, the rates being £950 for Rear-Admiral, £1,120 for Vice-Admiral and £1,300 for Admiral.

An additional increment in the full pay scale of Commanders and officers of relative rank is introduced after twelve years. Formerly the officers attained their

maximum rates after nine years. The increase after twelve years amounts to 3s. 6d. or 2s. 6d. a day.

SEA TRAINING OF CADETS.—Their Lordships have decided to re-institute the normal period of two terms training in H.M.S. " Vindictive " for ex-Dartmouth Cadets, beginning with those who joined the cruiser in May last from the R.N. College, Dartmouth. In September, 1936, the period was reduced from two terms to one. Cadets will be promoted to Midshipmen on leaving the training cruises as hitherto.

COMMISSIONS FOR NON-CADET ENTRIES.—On 1st September, seventeen acting petty officers were promoted to commissioned rank as Acting Sub-Lieutenant and appointed to the R.N. College, Greenwich. These were the first promotions to be made under the latest regulations for promotion from the lower deck, whereby candidates are trained together in a battleship under officers specially appointed for the purpose. These promotions were selected from thirty-one who appeared before a board at the end of July. H.M.S. " Resolution " is the ship selected for training lower-deck candidates.

GUNNERY RATINGS REORGANIZED.—A reorganization of the gunnery ratings of the Navy was announced in July. This has become necessary owing to the steady increase in complex mechanism and the rapid development in anti-aircraft gunnery in the Service. Ratings will in future specialize in four sections: *Quarters Section*, for gun numbers and men in charge of guns (except close-range anti-aircraft guns), magazines and shell rooms; *Layer Section*, for gun and director laying and training (except at close-range A.A. equipments); *Control Section*, for range-finding and the control of fire (except A.A.); and *Anti-Aircraft Section* (seamen only), for those employed as A.A. look-out, in loading, laying, and training at close-range A.A. equipments, and in the control of A.A. fire. New non-substantive badges for the sections are being designed.

OGILVY MEDAL AWARD.—The Ogilvy Medal, for the officer taking first place in the examinations to qualify for Torpedo Lieutenant, was awarded for 1938 to Lieutenant R. G. B. O. Roe, R.N.

METEOROLOGICAL COMMENDATION.—As a result of the examination of meteorological logs received in the Meteorological Branch of the Hydrographic Department during the year ended 31st March, Instructor Commander W. A. Bishop, M.A., R.N., was commended for the useful information furnished in the log compiled for H.M.S. " Amphion," flagship on the Africa Station.

CINEMA PROJECTORS.—As part of the development of the recreational facilities at present provided by the Admiralty Cinema Fund, a contract for the provision of 150 cinema projectors was awarded in September to Gaumont-British Equipments, Ltd. These projectors will be fitted in certain of H.M. ships during 1939 and used for training and recreational purposes.

REFERENCE LIBRARIES.—School reference libraries for issue to ships have been revised, and certain books on aeronautics and aero-engines have now been included. Supply of the new books is being made from the R.N. Store Depot, Deptford.

MATERIAL

NAMES OF NEW SHIPS.—The following names have been approved for ships of the 1938 new construction programme:—

Battleships (" Lion " Class).—" Lion " and " Temeraire."
Aircraft-Carrier.—" Implacable."
Cruisers (" Fiji " Class).—" Ceylon," " Jamaica," " Gambia," and " Uganda."

Cruisers (" Dido " Class).—" Charybdis," " Cleopatra," and " Scylla."
Submarines (" Triton " Class).—" Talisman," " Tetrarch," and " Torbay."
Minelayers.—" Abdiel," " Latona," and " Manxman."
River Gunboats.—" Locust " and " Mosquito."
Boom Defence Vessels (" Bayonet " Class).—" Bownet," " Burgonet," " Dragonet," " Signet," and " Sonnet."
Tugs.—" Marauder " and " Impetus."
Ferry Steamer.—" Magician."

Names for the destroyer depot ship, submarine depot ship, and Fleet Air Arm supply and repair ship will be announced subsequently.

As the name " Jamaica " has been selected for a cruiser, the name " Juno " has been substituted for " Jamaica " in the destroyers of the 1936 programme.

1938 PROGRAMME.—Orders for the three " Dido " class cruisers were placed in August with :—

Cammell Laird and Co., Limited, Birkenhead.
R. and W. Hawthorn, Leslie and Co., Limited, Hebburn-on-Tyne.
Scotts' Shipbuilding and Engineering Co., Limited, Greenock.

The programme also contains four large cruisers.

The contract for the aircraft-carrier " Implacable " was placed in October with the Fairfield Shipbuilding and Engineering Company, Limited, Govan.

Contracts for motor torpedo-boats have been placed, four with Vosper and Co., Limited, and two with J. I. Thornycroft and Co., Limited. A further contract for four special boats of the British Power Boat Company's 1938 design has been placed with this company, together with two experimental boats.

1937 PROGRAMME.—With the laying-down of H.M.S. " Kenya " by Alexander Stephen and Sons, Limited, Govan, in July, all seven cruisers of the 1937 programme are on the stocks.

The submarine depot-ship " Forth " was launched at Clydebank by John Brown and Co., Limited, on 11th August.

The surveying ship " Scott," which is to replace the " Fitzroy " on hydrographic work in home waters, was launched by the Caledon Shipbuilding and Engineering Company, Dundee, on 23rd August.

The minesweepers " Bramble " and " Britomart " were launched at Devonport Dockyard on 12th July and 23rd August respectively.

Motor torpedo-boat No. 7 was commissioned on 31st August as tender to the " Vernon," making a total of 13 of these boats in service, six of which are in the Mediterranean and another six have been allocated to the China Station.

1936 PROGRAMME.—H.M.S. " Naiad," first of the " Dido " class cruisers, will be launched at Hebburn-on-Tyne in December, and H.M.S. " Phœbe " at Govan in February.

The flotilla leader " Jervis " was launched by Hawthorn, Leslie and Co., Limited, at Hebburn-on-Tyne on 9th September, and the destroyer " Jersey " by Messrs. J. S. White, Cowes, on 26th September.

The minelaying submarine " Seal " was launched at Chatham Dockyard on 27th September, the last of the six of the " Porpoise " class.

H.M.S. " Seagull," built at Devonport Dockyard, commissioned there on 19th July for service in the 1st Minesweeping Flotilla.

H.M.S. " Undine," first of the new class of small submarines of 540 tons (730

tons submerged), was completed at Barrow-in-Furness in August and arrived at Portsmouth on 5th September. H.M.S. " Unity," of the same class, was commissioned at Barrow for trials on 13th August.

The surveying ship " Franklin " was completed by the Ailsa Shipbuilding Company, Troon, on 17th August, and arrived at Sheerness on the 20th.

The river gunboat " Scorpion " was completed by J. Samuel White and Co., Limited, Cowes, early in September, and left in tow for Hong Kong, where she is to replace the " Bee " as flagship in the Yangtse.

1935 Programme.—The cruiser " Manchester " was completed to full crew at Portsmouth on 9th August, and left on 26th September for the East Indies. The " Liverpool " was commissioned by the Fairfield Company at Govan on 19th September.

The destroyer " Mohawk," third of the " Tribal " class, was completed by Messrs. Thornycroft in August, and completed to full crew at Portsmouth on 9th September. The " Zulu," built by A. Stephen and Sons, Govan, was commissioned on 6th September for acceptance trial and service in the 1st Tribal Flotilla.

The minelaying submarine " Cachalot " was completed by the Scotts' Company, Greenock, on 15th August.

Research Ship.—The Royal Research Ship " Research," building by Philip and Son, Limited, Dartmouth, will probably be launched in February and be ready for her first cruise, to the South Atlantic, in October, 1939. The " Research " is to investigate the problems of the variation of the earth's magnetic field and atmospheric electricity, and will be virtually a non-magnetic ship. Her hull will be built of teak and Canadian rock elm, copper sheathed. To reduce the quantity of steel in the Diesel engines a bronze alloy is being used extensively, and the crankshaft will be of special non-magnetic steel. The ship will be rigged as a brigantine, with a full sail area of about 12,000 square feet.

New Design of Picket Boat.—Trials were made in the Thames on 21st July of the first of a new design of motor-driven picket boat built by Messrs. Thornycroft, propelled by Diesel engines, whereby the risk of fire is practically eliminated and endurance greatly increased. The boat is capable of over 20 knots, and can accommodate 45 men.

Exercises and Cruises

Channel Exercise.—A combined operations exercise was held in the Channel between 5th and 10th July with the object of practising a surprise landing in hostile territory. Naval forces on the attacking side were drawn from the Home Fleet and Portland, and were under the orders of Rear-Admiral G. F. B. Edward-Collins, C.B., C.V.O., Commanding Second Cruiser Squadron. They included one battleship, one aircraft-carrier, two cruisers, one destroyer flotilla, one minesweeping flotilla, and some anti-submarine patrol craft. Naval forces on the defending side were drawn from the Portsmouth and Plymouth Commands, and were under the orders of Admiral of the Fleet Lord Cork, Commander-in-Chief, Portsmouth. They consisted of six destroyers and some submarines. Troops of the 3rd Division, Southern Command, were engaged, and No. 16 (Army Co-operation) Squadron, R.A.F., carried out tactical reconnaissance for the defending force.

North Sea Exercise.—Another combined operations exercise took place from 19th to 23rd July in the North Sea and on the East Coast, to test the defences of the Thames, the Medway, Harwich, the Tyne and the Forth against air and sea

attack. The Blue or attacking force was under Admiral Sir Charles Forbes, Commander-in-Chief, Home Fleet, and included four battleships, the aircraft-carrier "Courageous," four cruisers, destroyers of the 4th and 6th Flotillas, and submarines of the 2nd Flotilla.

The Red or defending forces included the cruisers "Sheffield" and "Cornwall," four "Beagle" class destroyers of the 8th Division, all representing larger forces. The military forces included coast defence units of the Royal Artillery and Royal Engineers, and the air units eight squadrons of general reconnaissance aircraft, one of torpedo bombers, and four of fighters, with six aircraft allotted for coast artillery co-operation.

It was officially stated that the exercise very fully achieved the objects for which it was designed. In so doing, however, the commanders of some of the forces, notably those of the Blue side, had courses of action imposed on them which were not necessarily of their choice.

HOME FLEET.—The Home Fleet began its autumn cruise on 6th September, to Invergordon and Rosyth. A number of R.N.V.R. officers and men joined the Fleet to undergo annual training. The Fleet left Cromarty Firth on 13th September for exercises, in which aircraft from the R.A.F. base at Evanton co-operated. The target-ship "Centurion," operating under wireless control, was also present.

MEDITERRANEAN.—The Mediterranean Fleet left Malta for its autumn cruise on 10th September, to ports on the Eastern part of the station. The cruiser "Devonshire," Captain G. C. Muirhead-Gould, with the new destroyers "Afridi" and "Cossack," visited Istanbul from 19th to 21st September, and rejoined the Fleet at Alexandria.

AMERICA STATION.—The flagship "York" visited British Columbia waters during July and August. The escort vessel "Dundee," which cruised on the northern part of the station, grounded in a fog near Ellis Bay, Anticosti Island, in the Gulf of St. Lawrence, on 20th September. The "Exeter" and "Ajax" were in South American waters, and visited Buenos Aires in company during the first half of October.

AFRICA STATION.—The "Amphion" was ordered to leave Simonstown on 19th October to cruise on the West Coast and to return to Portsmouth in December. The flag of the Commander-in-Chief was to be transferred at Dakar on 28th November to the "Neptune." The "Amphion" is to join the Australian Navy as the "Perth," and about July next will be replaced as flagship on the Africa Station by the "Devonshire."

SUBMARINE CRUISE.—The submarine "Thames" left Malta on 6th September for a cruise around Africa, the first time a British submarine had visited the Cape. She arrived at Freetown, Sierra Leone, on 18th September.

PALESTINE.—The situation in Palestine having become worse, the cruiser "Emerald," on her way home from the East Indies, proceeded to Haifa on 6th July. On the 8th she was relieved by the "Repulse," which landed marines to assist in policing the town. The "Malaya" arrived at Haifa on 22nd August to relieve the "Repulse" on the latter being ordered home.

ORGANIZATION AND DISTRIBUTION

BATTLESHIPS.—The "Ramillies" and "Royal Oak" have been ordered to join the Mediterranean Fleet in place of the battle-cruisers "Repulse" and "Hood" respectively. The latter were sent to the Mediterranean in 1936 as a temporary measure, and have rejoined the Home Fleet.

The " Barham " arrived at Malta on 5th August after refit and recommissioning, and has rehoisted the flag of the Rear-Admiral, First Battle Squadron, in succession to the " Malaya."

CRUISERS.—The " Emerald " returned to Chatham on 17th July on being withdrawn from the East Indies Station, where the new cruiser " Liverpool " will replace her.

The " Kent," after large repairs at Chatham, arrived at Hong Kong on 4th September, and on the 26th hoisted the flag of the Commander-in-Chief in place of the " Cumberland," which was ordered home. H.R.H. the Duke of Kent visited the " Kent " at Sheerness on 7th July and lunched on board.

The " Cardiff " arrived at Hong Kong on 26th September for service on the China Station and in the Yangtzs in place of the " Capetown," which was reduced to reserve at Devonport on 31st August.

The flag of Rear-Admiral J. H. D. Cunningham, C.B., M.V.O., was hoisted in the " Shropshire " at Malta on 19th September on his assuming command of the First Cruiser Squadron, in succession to Vice-Admiral C. E. Kennedy-Purvis, C.B.

DESTROYERS.—The " Beagle " recommissioned with the Devonport crew of the " Stronghold " on 7th September to replace the latter as attendant destroyer on H.M.S. " Furious."

The " Whitehall " was commissioned with a Devonport crew on 6th September as seagoing training ship for boys, attached to the Reserve Fleet.

MOTOR TORPEDO BOATS.—Nos. 7 to 12 motor torpedo boats have been sent to the China Station, where they will form No. 2 M.T.B. Flotilla, under the command of Lieutenant-Commander D. G. Clark, in M.T.B. 10.

FLEET AIR ARM

SUPPLY OF TECHNICAL OFFICERS.—Technical officers for the Fleet Air Arm when it comes entirely under naval control will be provided partly from the Engineering Branch and partly from the new short-service Air Branch. Selected officers from both will undergo a course of training at the R.A.F. School at Henlow.

Engineer officers must have between six months and two years seniority as Lieutenant (E), and have completed a year's sea service since leaving their training establishment. They will be given a two-year course, which will include a full flying course during the first year. They will serve for one commission on piloting duties in the Fleet Air Arm in a catapult ship, followed by two appointments for technical duties, after which they will revert to general engineering duties until after promotion to Commander (E), when they will be available for the senior technical posts in the Fleet Air Arm as Commander (E) or Captain (E).

Air Branch officers will be selected for technical duty after completing one commission for general flying duties in the Fleet Air Arm, and will have a two-year technical course, after which they will be employed on technical duties in the F.A.A. Officers so selected will be retained for at least fifteen years from date of entry, and in general until they qualify for retired pay. They will be eligible for promotion to Commander (A) and Captain (A).

As a temporary arrangement, with a view to the immediate provision of technical officers, a number of more senior engineer officers will undergo a course of training in aeronautical engineering without receiving flying instruction. The first of these officers joined the R.A.F. School at Henlow on 29th August.

AIRCRAFT MAINTENANCE.—Three new classes of naval ratings have been established for the duties of aircraft maintenance hitherto carried out by the R.A.F. They will be known as Air Artificers, Air Fitters and Riggers, and Air Mechanics. Air Artificers will correspond to the present naval ratings of Engine-room Artificer, Electrical Artificer and Ordnance Artificer, and will undertake the more highly skilled duties of maintenance in workshops and aircraft carriers. Air Fitters and Air Riggers will correspond roughly to Artisans. In common with Air Artificers, they will ultimately be obtained from air apprentices. Air Mechanics will carry out the less highly skilled duties of aircraft maintenance, and this branch will be open to naval ratings now serving. They will have a year's course at a R.A.F. establishment until a naval air training establishment is available, and will be dressed as seamen with a distinguishing badge.

By agreement with the Air Ministry, a limited number of airmen who volunteer may be transferred to the aircraft maintenance branches of the Navy. Airman Pilots and Air Observers are not eligible for such transfer.

AIR BRANCH OFFICERS' DUTIES.—(A) officers of the Royal Navy will exercise full powers of command within the Fleet Air Arm in accordance with their naval rank and seniority and on an equal footing with executive and R.M. officers appointed to the F.A.A. Their duties afloat will comprise: (i) Flying, administrative and specialist duties within the F.A.A., and staff duties in respect of air matters; (ii) when not required for duty in connection with aircraft, such general ship's duties, including watch-keeping in harbour, as the Captain may consider them fit to perform, having regard to their rank, seniority, training and experience.

COMPLETION OF THE "ARGUS."—H.M.S. "Argus," Captain W. G. Benn, was completed to full crew at Plymouth on 9th August for service as training carrier and depot-ship for pilotless target aircraft. A Fleet Requirements Unit of the Fleet Air Arm was formed at Lee-on-the-Solent on 11th August for embarkation in the "Argus." Its duties will be to provide co-operation with the fleet at sea, whether in home or foreign waters, in accordance with Admiralty requirements. This unit will not be equipped with pilotless target aircraft, which will continue to be supplied and maintained for all purposes (including co-operation with the Fleet) by Air Force units.

ROYAL MARINES

DIRECTOR OF RECRUITING.—Colonel J. M. Tuke, O.B.E., R.M., was succeeded on 1st September as Director of Naval Recruiting by Lieutenant-Colonel A. C. St. Clair-Morford, from the Portsmouth Division, Royal Marines, and formerly Fleet R.M. Officer, East Indies Station.

PAY OF R.M. POLICE.—The pay of sergeants and constables in the R.M. Police has been increased, as from 21st May, 1938, to the following: Sergeants, 8s. 6d. a day for the first two years, 9s. a day thereafter; Constables, 6s. 8d. a day for two years on probation, 7s. a day after two years, subject to proficiency, 7s. 3d. a day after three years, and 7s. 6d. a day after four years.

It has also been decided that in future personnel of the R.M. Police of the rank of Inspector and below shall normally be retained in the Force until they have reached the age of 55 years; in exceptional cases service may be extended for a further period not exceeding five years.

DOMINION NAVIES

ROYAL AUSTRALIAN NAVY

TRANSFER OF A CRUISER.—The cruiser "Apollo" was formally transferred to the Royal Australian Navy at Devonport on 14th October, when Mr. Stanley Bruce, High Commissioner for Australia in London, was present and addressed the ship's company. The vessel was renamed H.M.A.S. "Hobart."

RETURN OF THE "ALBATROSS."—The seaplane-carrier "Albatross," Captain H. G. D. Acland, D.S.O., arrived at Plymouth from Australia on 8th September to be transferred to the Royal Navy in part payment for the cruiser "Hobart" (late "Apollo"). She was to pay off on 6th October and to be transferred to the R.N. on that day.

ROYAL CANADIAN NAVY

NEW DESTROYERS.—The destroyers "Ottawa" (late "Crusader") and "Restigouche" (late "Comet"), under the command of Captain V. G. Brodeur, R.C.N., left Portland on 6th September for Gaspe to begin duty in the Royal Canadian Navy.

FIRST CANADIAN ADMIRAL.—Commodore Percy W. Nelles, Chief of the Naval Staff of Canada, was promoted to Rear-Admiral in the Royal Canadian Navy to date 4th August. He is the first officer of Canadian birth, trained from a Cadet in the R.C.N., to reach this rank, at the age of 46 and after thirty years' service.

NEW CAPTAINS.—Commander G. C. Jones has been promoted to Captain from 1st August, and Commander L. W. Murray from 2nd August. Both were appointed Midshipmen in the R.C.N. in January, 1913.

ROYAL INDIAN NAVY

SQUADRON CRUISE.—The "Clive," "Indus," "Hindustan" and "Lawrence," under the command of Rear-Admiral H. Fitzherbert, C.B., C.M.G., with his flag in the first-named, cruised from Bombay and Karachi to ports in the Persian Gulf during the summer.

TRANSFER OF WARRANT OFFICERS.—Petty and Chief Petty Officers have been invited to volunteer for appointment in the R.I.N. as Warrant Telegraphist, Acting Gunner, or Signal Boatswain, with the prospect of permanent transfer after two years. Because of the limited accommodation in Bombay preference will be given to bachelors or widowers without children.

NIGERIA R.N.V.R.

The King has approved an Order in Council for the defence of Nigeria, whereby authority is given for the maintenance and use of vessels of war at the expense of the colony. The Admiralty is authorized to accept any offer by the Government of Nigeria to place for service with the Royal Navy any vessel of war so maintained. All officers and men will be available for service in the Royal Navy in case of emergency, and will form part of the R.N. Volunteer Reserve.

FOREIGN NAVIES

FRANCE

NEW BATTLESHIPS.—The first of the 35,000-ton battleships belonging to the 1938 Supplementary Programme is to be built at Brest Arsenal and will be named the " Clemenceau."

The " Richelieu " is due to be floated at Brest during the month of November, and the " Jean Bart " should be ready for launching early in 1939. The latter is building at Saint-Nazaire.

The " Strasbourg," classified as a battle cruiser, although she joined the fleet officially on the 13th June last, is still doing trials and will not be ready for actual service before January, 1939. The following are the principal details of this ship :—

Length	705.4 ft.
Breadth	101.4 ft.
Draught	25 ft.
H.P.	125,000.
Speed (designed)	29.5 knots—but it is believed that this has been or will be largely exceeded.
Armament	Eight 13-in. guns in two quadruple turrets; sixteen 5.1-in. guns in turrets; twelve 4-in. and sixteen 1.4-in. A.A. guns.
Radius of action	4,600 miles.
Complement	66 officers and 1,315 men.
Aircraft	4.

NEW DESTROYERS.—The destroyer " Fleuret," of the " Hardi " class, was launched on the 28th July. This ship displaces 1,800 tons and carries an armament of six 5.1-in., four 1.5-in. automatic and four mitrailleuses A.A. guns, and seven 21-in. torpedo tubes. With a h.p. of 58,000, they have a designed speed of 38 knots.

The " Baliste " has successfully completed her trials.

Two further 1,800-ton destroyers will shortly be launched from the Forges et Chantiers de la Gironde.

SECOND LIGHT SQUADRON.—Rear-Admiral Lacroix took over the command of the Second Light Squadron on the 8th August, hoisting his flag in " Le Fantasque " until the " Mogador " completes her trials. This squadron of eleven contre-torpilleurs is being organized in four divisions :—

6th C.-T. Division : " Mogador " (flag) and " Volta."
8th C.-T. Division : " L'Indomptable," " Le Malin " and " Le Triomphant."
10th C.-T. Division : " Le Fantasque," " Le Terrible " and " L'Audacieux."
4th C.-T. Division : " Tigre," " Lynx " and " Panthère."

APPOINTMENTS.—The following are some of the more important appointments which have been made recently : Rear-Admiral Tavera, Deputy Chief of the Naval Staff at the Ministry of Marine, in succession to Vice-Admiral Ollive ; Rear-Admiral Michelier, Head of the Aéronautique Navale at the Ministry of Marine ; Capitaine de Vaisseau Denis de Rivoyre, Naval Attaché to the French Embassy in London.

INCREASED ENTRIES.—Admissions to the Naval School in 1938 have been increased from 85 to 115, and to the Ecole des Elèves Ingénieurs Mécaniciens from 20 to 30.

College des Hautes Etudes de Défense Nationale.—The French College which is the equivalent to our Imperial Defence College includes amongst its students for 1938–39, ten officers or civil servants from the Ministry of National Defence in War, and five from each of the Ministries of Marine and Air. The new term, which is the third since the College opened, will last five and a half months from 1st November, 1938, to 5th April, 1939.

GERMANY

Cruiser Types.—In an article in the *Militar Wissenschaftliche Rundschau*, Rear-Admiral Grasman appears to come to somewhat similar conclusions to those which have been expressed on various occasions in this Journal as regards cruiser types, and he maintains that it is impossible to construct a cruiser which will meet all the various requirements of that class.

For the protection of merchantmen on the high seas when within reach of naval bases, he considers that a ship of from 6,000 to 8,000 tons is ideal. She should be armed with four 8-in. guns and protected to keep out 6-in. projectiles. She should be able to attain an average speed of 33 knots and carry four to six aeroplanes.

For the destruction of enemy trade and the interruption of ocean lines of communication, he maintains that all naval units from submarines to battleships can be used, but when naval bases are lacking the most successful commerce raider is the fast cruiser of the type used in the second half of the Great War. He considers that the use of large aeroplanes is dubious owing to their dependence on weather and inability to cope with a warship.

For fleet work, he advocates a cruiser of from 4,000 to 5,000 tons displacement with an armament of six 6-in. guns mounted half forward and half aft, together with a numerous battery of smaller anti-aircraft guns; her speed should be approximately 40 knots and she should be given light armour over her vitals. The most important features of this type are, he considers, that it should be small and have high speed. For what he calls "tactical exploration in battle" the large modern destroyer is preferred.

Kiel Harbour.—According to the *Kriegsmarine*, Kiel is rapidly regaining its importance as a military base. After a year's interruption caused by lack of structural materials, new quarters for officers, technical inspectors' laboratories and additional shops are being rapidly completed. It is also reported that work is continuing in night and day shifts on the building of the new German fleet.

ITALY

Naval Estimates.—The naval budget for 1938–39 amounts to 2,013,000,000 lire, which is 155,000,000 lire more than last year. This will be another step towards providing Italy with a fleet of 700,000 tons under twelve years old in 1941. It is reported that included in this tonnage will be 170 submarines.

Aircraft Carrier Policy.—It has been officially announced that the Italians will not build aircraft carriers. In view of the speed and radius of action of modern aeroplanes and the limited carrying capacity of carriers, the latter are regarded as being not very valuable for work over waters in which Italy is interested. "Carriers," it is stated, "are expensive and require escorts. One of them could carry 20 bombers and 20 scouting aircraft, but Italy could assemble a much greater force from her land bases in a short time. The Italian air force at the beginning of the current year provided 106 aeroplanes for battleships and cruisers, four and three on each type respectively; 180 scouting aircraft in fifteen squadrons; 48 pursuit aircraft in four squadrons, and 80 torpedo bombers; a total of 414."

NEW CONSTRUCTION.—The following destroyers have been launched recently from Italian yards: "Fuciliere," "Ascaro," "Carabiniere" and "Bersagliere." These are all vessels of 1,620 tons standard displacement, but about 1,900 tons full load.

The submarines "Emo," "Guglielmotti" and "Morosini" have also been put afloat.

All the sixteen torpedo boats of the "Partenope" class of 679 tons are now afloat.

INCREASED NAVAL PERSONNEL.—In order to provide for the requirements of Italy's ever-growing fleet, larger classes are being admitted to the Royal Naval Academy at Livorno. It is reported that this increase is to be completed by 1942. The established strength will provide for 2,275 executive and 1,030 engineer officers.

JAPAN

NEW CONSTRUCTION.—The last of the six cruisers of the "Mogami" class was launched at Nagasaki in the Spring of this year. The armament of this ship and her predecessors, the "Takuma" and "Tone," has been reduced from fifteen to twelve 6.1-in. guns. It would appear that the original armament of fifteen 6.1-in. guns together with eight 5-in. anti-aircraft weapons, has proved excessive from the point of view of stability.

A third aircraft tender, the "Miduho," was also launched from the Kawasaki works at Kobe last May. These are ships of 9,000 tons with a speed of 17 knots and armed with six 5-in. A.A. guns. She belongs to the second Supplementary 1933 Building Programme. Except for this vessel and a repair ship, the "Akasi," all the ships of that programme are now in commission.

RECOVERY OF CHINESE CRUISERS.—It is reported that the Chinese cruisers "Ning Hai" and "Yat Sen," which were damaged and stranded in the Yangtse, have been refloated by the Japanese and are being taken over for their navy.

NETHERLANDS

NEW CONSTRUCTION.—The cruiser provided for in the 1938 Budget will displace 8,300 tons and carry ten 5.9-in. guns mounted in two triple and two twin turrets. The anti-aircraft battery will consist of twelve 1.5-in. machine guns and there will be six 19.8-in. torpedo tubes. Two catapults are being fitted, and she will carry two seaplanes. The designed speed is 32 knots. The ship will have one funnel, as in the "De Ruyter," and the fore superstructure will be in tower form surmounted by a fire control position. She will be the largest unit in the Netherlands navy.

According to a report in the *Handelsblad* of the 2nd August, there are 21 ships nominally under construction, but it will be a long time before they are all in service. The four destroyers now under construction are bigger and more heavily armed than the eight of the "Admiral" class building for the East Indies Defence. A new type is the motor gunboat, three of which are shortly to be constructed. They will be armoured and carry four 4.7-in. and four 1.5-in. A.A. guns with depth charges, and have a maximum speed of 18 knots.

Two new submarines, the "K.XIX" and "K.XX," are nearly completed. They will be the first submarine minelayers and will each carry forty mines as well as eight torpedo tubes. The next class, "K.XXI" to "K.XXVII," will be larger than their predecessors.

The flotilla leader "Tromp" was handed over officially to the navy on the 17th August and commissioned the following day.

NAVAL AIR SERVICE.—The Naval Air Service is to be strengthened by the addition of forty-eight Dornier flying boats which are described as being very sea-

worthy. A seaplane base is being developed at Amboina, but is not expected to be ready to receive its personnel until some time in the first half of 1939.

SOVIET UNION

BALTIC FLEET.—The principal units of the Baltic Fleet carried out exercises in that sea during the Summer. The battleships did full calibre firings. When returning to Kronstadt, boats were lowered some 40 miles from the port and ordered to make their way to harbour independently.

ASSISTANT POLITICAL OFFICERS.—Political Officers, whether serving afloat or in naval establishments ashore, now have a deputy drawn from the lower deck, who is called the Deputy Political Officer. The object of this is to increase political influence amongst the men of the lower deck.

SPAIN

GOVERNMENT NAVY.—The destroyer "José Luis Diez," which took refuge first at Falmouth and then at Havre after the fall of Santander in August, 1937, attempted to run through the Straits of Gibraltar on the night of 26th–27th August. The Nationalists had spread a screen off Casablanca and in the Straits to catch her. She was waylaid at 3 a.m. on the 27th a little to the eastward of Gibraltar by the cruiser "Canarias" and three destroyers. In the course of a running fight, the "José Luis Diez" was crippled by an 8-in. shell from the "Canarias," which hit her on the port bow, flooding the forward compartments and crew space. The destroyer ran into Gibraltar harbour without permission and has since remained there. Her casualties were 26 dead and 10 wounded.

UNITED STATES

NEW CONSTRUCTION.—With reference to the table published in last quarter's JOURNAL, it is now reported that the keel of the battleship "Washington" was laid down at Philadelphia on the 14th June. It is anticipated that she will take fifty-two months to build.

The construction of the four battleships, four light cruisers, one aircraft carrier, eight destroyers and six submarines, for which financial provision has already been made by Congress, is to be speeded up. It is understood that battleships of over 35,000 tons will not be laid down at present, but a design for a 45,000-ton ship is being prepared and should be ready about the middle of next year.

MODERNIZATION OF AIRCRAFT CARRIERS.—The carriers "Lexington" and "Saratoga" are to be modernized at a cost of $7,500,000 each. The work will include the redistribution of existing equipment and the installation of new equipment, such as modern catapults, etc. A bulge is to be fitted on the port side, which will give the ships a beam of 108 ft., which is just 2 ft. less than the width of the Panama Canal locks.

COMBINED NAVAL AND MILITARY OPERATIONS, 1939.—Extensive Combined Exercises are to be carried out in the Atlantic Ocean in January next. The area of operations will extend as far South as the coast of Brazil and North to Culebra. They will include an elaborate landing exercise in which the Army and Marine Corps will operate in conjunction with the fleet.

FLAG RANK.—Hitherto Flag Officers in the United States navy have not held any permanent rank higher than that of Rear-Admiral, the ranks of Vice-Admiral and Admiral being held only during the tenure of certain appointments. A law has now been introduced which enables officers who have held such high appointments as Chief of Naval Operations (equivalent to First Sea Lord) to assume the rank of Admiral or Vice-Admiral on retirement, subject to their having held the appointment two and a half years or more, and to the President's approval.

ARMY NOTES

His Majesty the King

The King has approved of the following appointments :—

Aide-de-Camp General to the King.—General Sir Charles Bonham-Carter, K.C.B., C.M.G., D.S.O., Governor and Commander-in-Chief, Malta.

Aides-de-Camp to the King.—Brigadier R. M. Wootten, M.C.

Brigadier G. B. Rowan-Hamilton, D.S.O., M.C.

Brigadier G. G. Rawson, O.B.E., M.C.

Brigadier E. J. Ross, O.B.E., M.C.

Colonel Commandants.—Lieut.-General Sir Maurice G. Taylor, K.C.B., C.M.G., D.S.O., as Colonel Commandant, Corps of Royal Engineers.

Major-General G. M. Lindsay, C.B., C.M.G., D.S.O., as Colonel Commandant, Royal Tank Corps.

Major-General C. W. Macleod, C.B., C.M.G., D.S.O., as Colonel Commandant, Royal Army Service Corps.

Major-General E. A. Osborne, D.S.O., as Colonel Commandant, Royal Corps of Signals.

Colonels of Regiments.—Field-Marshal Sir Cyril J. Deverell, G.C.B., K.B.E., as Honorary Colonel, 14th Australian Battalion.

Major-General J. R. M. Minshull-Ford, C.B., D.S.O., M.C., as Colonel, The Royal Welch Fusiliers.

Major-General V. H. B. Majendie, D.S.O., as Colonel, The Somerset Light Infantry (Prince Albert's).

Colonel (Hon. Brigadier-General) G. W. St. G. Grogan, V.C., C.B., C.M.G., D.S.O., as Colonel, The Worcestershire Regiment.

Colonel J. J. Richardson, D.S.O., as Colonel, 13th/18th Royal Hussars (Queen Mary's Own).

HOME

The following appointments and promotions are announced :—

Major-General H. E. Franklyn, D.S.O., M.C., from Commandant, Sudan Defence Force, to be Commander, 5th Division.

Major-General P. C. S. Hobart, D.S.O., O.B.E., M.C., from Director of Military Training, the War Office, to be Commander, the Mobile Division, Egypt.

Colonel (temp. Brigadier) A. N. Floyer-Acland, D.S.O., M.C., from Commander, 3rd (Jhelum) Infantry Brigade, to be Commander, 50th (Northumbrian) Division, T.A., with the rank of Major-General.

Colonel (temp. Brigadier) *Hon.* P. G. Scarlett, M.C., from Commander, 12th Infantry Brigade, to be Commander, Deccan District, India, with the rank of Major-General.

Colonel (temp. Brigadier) W. Platt, D.S.O., A.D.C., from Commander, 7th Infantry Brigade, to be Major-General Commanding, the Troops in the Sudan, and Commandant, Sudan Defence Force.

Colonel (temp. Brigadier) R. Evans, M.C., A.D.C., from Deputy Director of Military Intelligence, War Office, to be Commander, Mobile Division, with the rank of Major-General.

Anti-Aircraft Appointments

Major-General J. H. Marshall-Cornwall, C.B., C.B.E., D.S.O., M.C., from Chief of the British Mission to the Egyptian Army, to be Deputy Chief of the Imperial General Staff (Anti-Aircraft Defence), War Office, with the rank of Lieutenant-General.

Major-General A. F. Brooke, C.B., D.S.O., from Commander, Mobile Division, to be Commander, Anti-Aircraft Corps, with the rank of Lieutenant-General.

Colonel (temporary Brigadier) L. R. Hill, O.B.E., from Commander, 28th (Thames and Medway) Anti-Aircraft Group, Territorial Army, to be Director of Training and Organization (Anti-Aircraft), War Office, with the rank of Major-General.

Colonel (temporary Brigadier) L. D. Hickes, O.B.E., M.C., from Assistant Director, Territorial Army, War Office, to be Commander, 3rd Anti-Aircraft Division, Territorial Army, with the rank of Major-General.

Colonel (temporary Brigadier) H. G. Martin, D.S.O., O.B.E., from Commander, Royal Artillery, 4th Division, to be Commander, 4th Anti-Aircraft Division, Territorial Army, with the rank of Major-General.

Colonel (temporary Brigadier) A. G. Cunningham, D.S.O., M.C., from Commander, Royal Artillery, 1st Division, to be Commander, 5th Anti-Aircraft Division, Territorial Army, with the rank of Major-General.

General.

Promotion of Officers.—The *London Gazette* of 5th August, 1938, was the largest in the history of the Army, and contained the names of more than 2,000 officers—nearly one-third of the Subaltern Officers and Captains in the British Army promoted on 1st August as a result of the "New Conditions of Service" scheme announced by Mr. Hore-Belisha, Secretary of State for War.

In future, subject to efficiency, every subaltern officer will become a Captain in 8 years, and every Captain will become a Major in a further 9 years.

Every efficient officer, entering at the normal age, will be sure of approximately 10 years' service in the rank of Major, if not previously promoted. Beyond the rank of Major promotion will be by selection to fill particular appointments.

The system whereby officers waiting for appointments are put upon half pay will be abolished. The tenure of command and staff appointments generally will be reduced from 4 years to 3.

The ages of retirement for each particular rank will be lowered: Generals and Lieutenant-Generals from 67 to 60; Major-Generals from 62 to 57; Colonels from 57 to 55; Lieutenant-Colonels from 55 to 50; and Majors from 50 to 47.

The effect of these proposals is considerably to accelerate promotion and thereby to give increased pay at lower ages. In the subaltern ranks, however, in the years before the advantages of this acceleration begin to operate, there will be a substantive increase of pay in the case of 2nd Lieutenants by 1s. a day, and of Lieutenants by 1s. 2d. a day.

Further, 100 scholarships of £20 a year, tenable for three years, will be distributed annually, and thus cumulatively, among subalterns on first commission who need this assistance. This number will be subject to revision in the light of experience.

Retired pay in future will be based on a combination of age and length of total service, up to the rank of Colonel, inclusive, and thereafter will be at fixed rates for each rank. The maximum rate of retired pay, therefore, for each rank can in general be earned before the retiring age for that rank, and nothing is lost from periods of unemployment, which in future, if they occur, will be on full pay and not on half pay. To give an example, retired pay of £407 10s. per annum will be earned by a Major at the age of 46, having 23 years' service, whereas an officer of the same age and similar service might have had to retire as a Captain on retired pay of £271 10s. under the former regulations.

As the period of commissioned service for promotion to Captain is reduced from 8 to 6 years, and for promotion to Major from 15 to 12 years, there will also be an improved rate of promotion for quarter-masters who will earn retired pay in the rank of Major.

New Conditions of Service for Combatant Officers

(*a*) Promotion by Time.—In future promotion will be by time, instead of by vacancy as hitherto. Promotion to Captain will be at 8 years service, and to Major at 17 years service.

(*b*) Pay, Daily Rates.—A comparison between the new and old daily rates of regimental pay is as under :—

Rank.	*Present.*	*Rank.*	*New Rate.*
2nd Lieutenant	10/–	2nd Lieutenant	11/–
Lieutenant	11/10	Lieutenant (3 years service)	13/–
Lieutenant after 7 years service	14/6	Lieutenant (6 years service)	14/6
Captain	19/–	Captain (8 years service)	16/6
Captain after 15 years service	23/6	Captain (11 years service)	19/–
Major	28/6	Captain (14 years service)	23/6
Major after 5 years service as such	33/6	Major (17 years service)	28/6
Lieut.-Colonel (excluding command pay)	43/–	Major (22 years service)	33/6
		Lieut.-Colonel (excluding command pay)	43/–

In regard to the above table, although actual increases only appear in the cases of 2nd Lieutenants and Lieutenants, it is to be noted that the incremental rises are attained much earlier in the officer's career.

The rates of pay for Colonels and General Officers have been drawn up on a scale less complex than hitherto, and they represent, generally, an all-round increase.

(*c*) Staff Pay.—In future staff pay will depend on the rank of the holder, and not on the grading of the individual appointment as hitherto.

Rank of Holder of Appointment.	*Daily Rates of Staff Pay.*
Lieutenant	Regimental rates *plus* 2/6
Captain, Major, Lieutenant-Colonel	„ *plus* 5/–

(*d*) AGE LIMITS FOR RETIREMENT.—

	At Present.	*In Future.*
Major, Brevet-Major and below ..	50	47
Lieutenant-Colonel and Brevet Lieutenant-Colonel	55	50 (but allowed to finish tenure if it carries him beyond age 50).
Colonel and Brevet Colonel	57	55
Major-General	62	57
Lieutenant-General and General ..	67	60 (exceptionally 62 at discretion of the Army Council).

The Army Council may retain any officer beyond the age limit in the interests of the State.

(*e*) GRATUITY AND RETIRED PAY.—Under the new system, maximum rates of retired pay will be attained at a much younger age. A Lieutenant-Colonel will be able to attain his maximum retired pay of £543 per annum at age 46 provided he has 25 years service. Hitherto his rate would have been dependent on the length of his command.

The maximum Colonel's retired pay has been raised by £26 to £750, which can be earned at age 52 with 28 years service.

In the case of General Officers, rates of retired pay will be independent of the time served in the rank or length of service, but permission to retire in this as in other ranks will be at the discretion of the Army Council. The following are the rates: Major-General, £950; Lieutenant-General, £1,120; General, £1,300.

The new terms of service will be applied to all officers on the Active List with effect from 1st August, 1938, but in no case is the "axe" being resorted to and no officer will suffer any reduction in pay whilst holding his present appointment.

In its general outlines the scheme follows the principles that have governed the promotion of Indian Army officers for over a generation. In India, the system has, on the whole, worked well and has resulted in an efficient and contented corps of officers.

There is, therefore, every reason to hope that, by the new system, the same ends will be achieved in the British Service, where unequal conditions of promotion as between the officers of various corps have sometimes brought about the resignation or premature retirement of men whose services were of real value to the State.

COMMISSIONS IN THE REGULAR ARMY.—Twenty-five vacancies for commissions in the Cavalry, Royal Artillery, Royal Corps of Signals, Infantry and Royal Tank Corps of the Regular Army will be available for competition at the examination to be held in December next for candidates who are officers of the Supplementary Reserve and the Territorial Army. In addition, a limited number of vacancies for the Indian Army may be available. Successful candidates, provided that they have attained the age of 21 years, will be appointed on or about the 27th January, 1939.

PASSING-OUT LISTS.—The War Office has published the July Passing-Out Lists for the Royal Military Academy and Royal Military College; 84 Gentlemen Cadets of the Third Class at the Royal Military Academy and 172 Gentlemen Cadets of the Senior Division at the Royal Military College, qualified for appointment to Commissions in the Regular Army and Indian Army.

WARRANT OFFICERS, CLASS III.—On the 1st October, 1938, about 1000 Non-Commissioned Officers were promoted. They formed the first batch of selections

for the new rank of Warrant Officer, Class III, men of special character and ability promoted to hold command of platoons and equivalent sub-units hitherto commanded by subaltern officers.

Warrant Officers, Class III, will all be commanders, to be trained in officers' duties in tactics, in the use of weapons, and in administration. They will not only be available for duty as commanders, but for other officer employments, such as those with Signals, Transport, and so on. They will be able to undertake duty as Orderly Officers, on Courts of Inquiry and on Regimental and Garrison Boards; and will be given financial powers so that the handling of money and responsibility for accounts may be delegated to them in the same way as is done at present with subaltern officers.

Steps have also been taken which will widen the powers of Warrant Officers whether Class I, II or III, to enable them to be given financial powers to handle money and to have administrative powers to check stores, sign certificates, conduct drafts, supervise range practices and so forth.

Warrant Officers, Class III, will be introduced into Cavalry of the Line, R.A., Foot Guards, Infantry of the Line and R.T.C. in all units. In the Royal Signals they will be introduced into certain units only. The title of the new Warrant Officers, Class III, will be " Platoon (etc.) Sergeant-Major."

Formation of Section " E " of the Army Reserve.—The number of Warrant and non-commissioned officers' posts in the War Establishment of the Army, which includes many units non-existent in peace, is greatly in excess of the Peace Establishment. In consequence, under existing mobilization arrangements, most of the Warrant and non-commissioned officers' posts have to be filled on mobilization from serving personnel of units existing in peace, who are withdrawn at a time when they are most required.

To meet this situation, it has been decided to create a special Section " E " of the Army Reserve, to be open only to pensioner warrant and non-commissioned officers. At present pensioners have no liability to return to the colours on mobilization. Enlistment will be open only to ex-warrant and non-commissioned officers (not below the rank of corporal) who have been discharged to pension, are residing in the United Kingdom, and are medically fit for service at home and overseas.

Pensioners in receipt of disability pensions, or who are serving in the Supplementary Reserve or Territorial Army, or employed in certain specified positions of national importance, will not be eligible for enlistment. Pensioners who have been away from the colours for more than 4 years (R.A.O.C. 8 years) and those over the age of 50 years will not be eligible to enlist.

The terms of service will be enlistment and re-engagement for one year at a time. Pay will be at the post-1931 standard rate for Section " D," i.e. 9d. per day. Each man will be allotted a specific mobilization post. Reservists of Section " E " will be liable to be called out under the same conditions as those in Sections " B " and " D." When called out they will not count their additional service towards increase of pension. They will, however, continue to draw their pensions concurrently with their pay.

Existing pensioners who fulfil the terms regarding enlistment will be approached by the officer in charge of records concerned. Applications to enlist in Section " E " from serving warrant and non-commissioned officers who are due for discharge to pension must be submitted through officers commanding units.

War Office Appreciation.—The War Office announced that, during the week ending 30th September, 1938, it received many thousands of offers of individual

service in various capacities, together with applications for enrolment in the Officers Emergency and Cadet Reserves, and offers from public-spirited persons placing their works, premises, etc., at the disposal of the War Department. It is hoped to reply individually to all applicants and those offering service of various kinds at as early a date as possible, but in view of the great pressure of work entailed it may be some time before this can be done. The War Office highly appreciates the manner and promptitude with which these offers were made.

Officers Emergency Reserve.—Valuable service to the State can be given by men between 31 and 55 years of age who possess technical, academic or other special qualifications, but who have had little or no previous military experience. They, together with men who, although possessing previous military experience, are unable to join the Regular Army Reserve of Officers, the Supplementary Reserve or the Territorial Army Reserve of Officers, can join the Officers Emergency Reserve.

This Reserve of the middle-aged has been instituted in order that applicants may give an honourable undertaking to present themselves for military service if and when called upon to do so in a national emergency. Their names, addresses and qualifications will be registered at the War Office for this purpose, and there is no limit to the establishment.

Among the technical and specialist qualifications required are engineering (civil, mechanical, electrical or automobile); and such occupations as architects, chartered accountants, barristers, solicitors, dentists, chemists, journalists, magistrates, coroners, customs officers. Men proficient in foreign languages, versed in railway or sea transport, or having an intimate knowledge of countries of the British Empire and/or foreign countries, in possession of a university degree, or trained in military intelligence and/or cipher duties will be acceptable.

In the event of mobilization members should not write to or call at the War Office offering their services. All members will have been registered, and they will be notified as soon as their services are required.

Copies of application forms may be obtained from headquarters of commands and areas and from units of the Territorial Army, or direct from the War Office (A.G.5.Mob.), Whitehall, S.W.1.

Recruits' Physical Development Depots.—Soldiers who have passed from the two Recruits' Physical Development Depots to their regimental depots now number 1,001. The first Recruits' Physical Development Depot, now at Canterbury, was opened at Aldershot in May, 1937. The object was to take in, as probationer recruits, men offering themselves for the Army who were not up to the standard of weight or chest, and men on the border-line, or, in other words, with flat feet, fast hearts and other defects which might or might not be sufficiently bad to keep them out of the Army, but which could quite possibly be treated and cured in a short while.

Out of 1,335 entries at Canterbury 956 had, up to 31st August, 1938, been successfully treated and posted to depots; 101 failed; 66 were discharged for other reasons; and 212 were under training.

Army Technical Schools.—In order to make adequate provision for the training of apprentice tradesmen in the Army, it has been decided to open three new Army technical schools for boys. These will be located at Jersey, Fort Darland (near Chatham), and Arborfield (near Reading). The school at Jersey is designed to deal with 250 R.A.S.C. boys, and the provisional date of opening was 1st October, 1938.

The provisional date of opening the school at Chatham is January, 1939, and

approximately 250 boys, either R.A. or R.E. new entrants, will be placed under instruction at the outset. This school, which will be designed to deal eventually with a maximum of 1,000 boys, will be primarily a R.E. school, but the output of trained boys will not necessarily be entirely for that corps.

The school at Arborfield will be open in March, 1939, when about 500 R.A.O.C. boys, including 100 to be transferred from Jersey, will be placed under training. This school, which will be designed to deal ultimately with 1,000 boys, will deal primarily with apprentice tradesmen enlisted for the R.A.O.C.

CHANGES IN NOMENCLATURE OF INFANTRY OF THE REGULAR ARMY.—A change in the nomenclature of Infantry Battalions of the Regular Army is intended to denote the organizations of the three different types of infantry battalions and their sub-units, both of Foot Guards and Infantry of the Line.

The home-service battalions of The King's Royal Rifle Corps and The Rifle Brigade are to be termed " Motor Battalions." This term, however, does not apply for the present to the foreign-service battalions of these regiments. These battalions are needed in armoured formations, as such formations are unable to carry out many of the tasks which may confront them, unless they have infantry acting in close co-operation.

Units which are now organized as machine-gun battalions will continue to be designated as such, and will retain the present nomenclature for their sub-units, such as " machine-gun companies," " machine-gun platoons " and " machine-gun sections."

All remaining battalions of Infantry which are organized as rifle battalions will in future be termed " Infantry Battalions."

The depots of machine-gun regiments are in future to be termed " machine-gun depots," while those of regiments with " infantry battalions " will be known as " infantry depots." The term " Guards Depot " will be retained for the depot of the Foot Guards, and the depot of the King's Royal Rifle Corps and Rifle Brigade will continue to be known as the " Rifle Depot."

These changes in nomenclature will make no change in the official designation of the Regiments concerned, and Territorial Army units will be entirely unaffected until further instructions are issued by the War Office.

" TOMMY ATKINS."—Further investigation into the origin of the name " Tommy Atkins " has thrown some doubt on the accuracy of the paragraph published in Army Notes, November, 1937, on this subject.

The information, which was received from the War Office, was believed at the time to be accurate, but more detailed research, carried out at The Royal United Service Institution, has disclosed that the name " Thomas Atkins " was in use on Army Forms as early as 1815, i.e. long prior to the period when the Duke of Wellington was in residence at Walmer Castle.

These new facts, however, do not necessarily disprove the truth of the story—particularly as Private Thomas Atkins is believed to have been killed as early as 1794. They show, however, that wider investigations would be necessary before the origin of the name could be conclusively accepted.

CASUALTIES AMONG GENERAL OFFICERS.—In the War Office publication " Officers who died in the Great War, 1914–1919," the names of 26 General officers, including 19 Brigadier-Generals, are shown under " Commands and Staff " as having been killed or died of wounds.

The Historical Section (Military Branch) of the Committee of Imperial Defence,

however, have compiled a new list of 62 General officers killed or died of wounds, including Field-Marshal Lord Kitchener, drowned by enemy action.

There is reason to believe that this list is still incomplete, and it is hoped that further particulars may yet be received. The nominal roll of casualties to General officers is available for study in the Library of the Royal United Service Institution, and it is hoped that those interested in the subject will avail themselves of this opportunity.

STAFF COLLEGE CASUALTIES.—At the outbreak of the Great War there were, including both Camberley and Quetta graduates, 447 *p.s.c.* officers in the Service, and of these 219 were killed. This figure of 49.2 per cent. killed in action testifies more eloquently than words to the part played by the Staff Colleges in the World War.

TERRITORIAL ARMY

RECRUITING.—On 1st October the strength of the Territorial Army, 186,689 officers and men, was the highest recorded since the War. This compares with a present authorized establishment of 201,707. Moreover, it is known that the larger part of the recruiting rush during the emergency period towards the end of September is not yet reflected in the official figures. Even so, the Anti-Aircraft strength has been increased by 686 officers and men.

The comparative strength of the divisions (all ranks) at 1st October was as follows :—

	Peace Establishment.	*Strength.*	*Per cent of Strength to Establishment.*
55th (West Lancashire) Division	9500	9601	101.1
51st (Highland) Division	9906	9977	100.7
49th (West Riding) Division	9864	9590	97.2
50th (Northumbrian) Division	8875	8566	96.5
42nd (East Lancashire) Division	9857	9476	96.1
48th (South Midland) Division	9242	8678	93.9
53rd (Welsh) Division	9857	9225	93.6
52nd (Lowland) Division	9879	9127	93.4
54th (East Anglian) Division	9856	9060	91.9
The London Division	9991	8937	89.5
43rd (Wessex) Division	9099	8030	88.2
44th (Home Counties) Division	9772	8066	82.5
1st Anti-Aircraft Division	22669	21401	94.4
2nd Anti-Aircraft Division	25529	20721	81.2
Total T.A. Divisions	163896	150455	91.8

THE NEW CONDITIONS OF SERVICE.—The application of the new conditions of service for combatant officers in the Regular Army to officers in the Territorial Army and Supplementary Reserve has been under consideration by the Army Council. It has been decided that the time promotion introduced for the Regular Army will not apply to the Territorial Army, where promotion by establishment will remain in force.

The question of applying the new rates of pay for subalterns and captains is under consideration. It has been decided by the Army Council that the new age

limits introduced for the Regular Army will not apply to the Territorial Army. In units, tenures of command will be as at present, but higher appointments will be for three years, as in the Regular Army.

It has been further decided that W.Os III will not be introduced into the Territorial Army in place of a proportion of subaltern officers.

ANTI-AIRCRAFT AND COAST DEFENCE UNITS.—During the recent emergency the 1st and 2nd Anti-Aircraft Divisions and the Coast Defence units of the Territorial Army were mobilized and took up their war stations. These troops, therefore, in conjunction with the Royal Navy and the Royal Air Force, formed Britain's first line of defence against attack from overseas.

THE TERRITORIAL ARMY FIELD FORCE.—The Field Force units of the Territorial Army will in future be organized as follows :—

INFANTRY.—(*a*) The reduction of each infantry brigade from four battalions to three.

(*b*) The introduction of the modern battalion organization based on the light machine-gun in place of the old " mixed " battalion organization which still survives in the Territorial Army, but which has been abolished in the Regular Army.

(*c*) The introduction of machine-gun battalions.

ARTILLERY.—The adoption of the new artillery organization of field regiments, batteries and troops.

OTHER UNITS.—The re-equipment or conversion of existing units to provide : Cavalry Light Tank Regiments ; Anti-Tank Regiments, R.A. ; Light Anti-Aircraft Regiments, R.A. ; Tank Battalions ; and Motor-cyclist Battalions.

It is proposed that the Field Force formations of the Territorial Army shall be organized as follows :—

(*a*) Units required to form one Mobile Division on mobilization (there will be no Mobile Division Headquarters in peace).

(*b*) Nine divisions organized on the same pattern as that of Regular divisions, each consisting of three brigades of three battalions and divisional troops.

(*c*) Three divisions of a new pattern, each consisting of two brigades of three battalions and divisional troops. These divisions will be given an increased measure of mobility in peace and will mobilize as motorized divisions. The characteristics of these divisions are their handiness, flexibility and fire power. These new divisions find their parallel in the proposed six-battalion divisions of the Regular Army.

A motor-cyclist battalion will be included in each division. The Regular Army has not a unit of this kind, owing to its peace distribution, but such units are particularly appropriate to Territorials, offering an attractive opportunity to certain sections of the community to serve their country.

(*d*) The necessary corps and army troops, most of which are already in existence, but to which must be added :—

Tank Battalions ; Anti-Tank Regiments ; and Light Anti-Aircraft Regiments.

The above organization absorbs all existing Infantry battalions of the Territorial Army and gives the Territorial Army a similar organization to that now prevailing in the Regular Army.

THE KING'S PRIZE.—The King's Prize for the best field or medium brigade,

Royal Artillery, Territorial Army, was won on 24th September, 1938, at Larkhill by the 101st Field Brigade (Queen's Own Royal Glasgow Yeomanry), represented by the 401st Field Battery—Commander, Major T. U. Wilson.

Second place was taken by the 258th Field Battery—Commander, Major J. N. Rippon, forming part of the 65th (8th London) Field Brigade.

The 342nd Field Battery—Commander, Major Sir Patrick Coghill, forming part of the 86th (East Anglian) (Herts Yeomanry) Field Brigade, secured third place.

AUXILIARY TERRITORIAL SERVICE.—The King has approved the raising of an organization for women, to be known as the Auxiliary Territorial Service. Its object will be to free men for the performance of combatant duties, on the lines of the work of the W.A.A.C. during the War. Companies will be affiliated to military units and will train in the same way as the Territorial Army to become efficient for the performance of their duties in the event of a national emergency.

The total number of women required at the outset is approximately 25,000, and the categories which it is proposed to raise include the following: motor drivers, clerical personnel, general duties—cooks, orderlies, etc.

All personnel will be required to attend a minimum of ten drills a year and camp for a period of not less than eight and more than fifteen days in alternate years. Uniform will be worn by all personnel while on duty, and a badge will be provided for wear in plain clothes.

Volunteers should apply for particulars to the nearest Territorial Army drill hall.

INDIA

Important decisions have been taken with regard to the future strength and incidence of cost of the Army in India.

Following the conquest of Abyssinia by Italy in 1936 and the rapid deterioration of international relations in Western Europe and in the Mediterranean since that date, the strategic centre has shifted to the West.

A reduction, therefore, of the strength of the British troops stationed in India is not only possible but desirable, and with this object three battalions—and later a fourth—are to be withdrawn from India immediately and taken on the Imperial establishment. The battalions selected (1st Bn. The Buffs, 1st Bn. Bedford and Hertfordshire Regt., and 1st Bn. The Hampshire Regt.) are amongst those with the longest service overseas, the Buffs, for example, having been stationed abroad since 1922.

The strength of the Indian Field Force has, with effect from March, 1938, been fixed—at any rate temporarily—at three cavalry brigades and four Divisions of all arms; the 2nd (Sialkot) Cavalry Brigade is to be abolished.

These forces do not include those employed on internal security and as covering troops on the frontiers.

The increased cost of the Army has, for many years, been a source of embarrassment to the Indian Government, whose resources are but slender, the estimate for the Defence Services for the period 1938–39 having risen to £33,885,000.

The necessary reforms introduced by Mr. Hore-Belisha—British Secretary of State for War, in the conditions of service of British Army officers and men are to cost India a further £1,125,000 a year, and have evoked firm protests from every party in the Legislative Assembly.

In 1933, the committee, under Sir Robert Garran as chairman, to whom the question of allotment of cost as between the United Kingdom and India had been

referred, reported in favour of an annual grant to India of £1,500,000. The British Government have decided to increase this subsidy by £500,000 to £2,000,000 and to make a capital grant up to £5,000,000 for the re-equipment and mechanization of both British and Indian troops and for the provision of new aircraft for the R.A.F. in India. This generous action will go far to satisfy the grievances of the Indian political parties and will result in a far higher standard of military efficiency.

Finally, His Majesty's Government have appointed an expert committee under the chairmanship of Admiral of the Fleet Lord Chatfield to proceed to India and to submit a report. The terms of reference are: "Having regard to the increased cost of modern armaments, to the desirability of organizing, equipping and maintaining the Forces in India in accordance with modern requirements and to the limited resources available in India for defence expenditure, to examine and report, in the light of experience gained in executing the British rearmament programme, how these resources can be used to the best advantage, and to make recommendations."

The committee sailed during October, 1938, and will probably report early in 1939.

N.W. FRONTIER.—A new organization styled "The Khilafat Party" is, according to reports from *The Statesman*, being formed among certain sections of the Mohmands by two tribesmen, who have recently returned from Waziristan after several months stay as guests of the Faqir of Ipi.

The objects of the party are said to include the expulsion of King Zahir Shah from the throne of Afghanistan and the restoration of ex-King Amanullah.

The two chief instigators of this conspiracy, from a local point of view, are believed to be the so-called Shami Pir and the Faqir of Ipi. The Shami Pir—a Syrian Imam, has lately been removed from the North-West Frontier and flown by Imperial Airways from Karachi to Basra, whence, it is understood, he will make his own way back to Syria. The Pir's real name is Sayed Mahomed Sadi, and he comes of a well-to-do family in Damascus which became related by marriage to Mahmud Tarzi—father-in-law of ex-King Amanullah; his age is estimated at about 38 to 40.

The Pir entered Waziristan by way of Karachi in March, 1938, and shortly afterwards became engaged in seditious activities and in the raising of armed *lashkars*. He was well equipped for the task which he had undertaken, as he speaks six languages fluently and was plentifully supplied with money.

After a short period of preparation, the Wazir *lashkar*, many of whom were in receipt of 40 Afghan rupees monthly from the Pir, marched westwards and invaded the Afghan Eastern Province. Here they came into contact with Afghan Regular forces amounting to two brigades and some 10 aircraft. Sporadic fighting continued throughout June and the *lashkar*, which was continually reinforced from the East, soon amounted to over 2,000 riflemen. Various provincial treasuries were looted and Jalalabad threatened.

Becoming alarmed at the spread of the revolt, the Afghan Central Government despatched further reinforcements amounting to two brigades, and after severe fighting drove the rebels into the Gomal valley, where, on 24th June, they were routed with a loss of 161 killed, including their leader, Shashi.

During this period there was general unrest in British Waziristan, including sniping of convoys, attacks on road piquets and poisoning of water supplies, culminating later in a large-scale attack on Bannu City.

The Afghan Eastern Province is now reported to be quiet, but the chances are that—as long as the Faqir of Ipi is at large—it is unlikely that the peace of the Border will be long maintained.

INDIA GENERAL SERVICE MEDAL.—His Majesty the King has been graciously pleased to approve of a new medal being struck to commemorate military operations in, or on the frontier of, India, to take the place of the medal instituted under Army Order I of 1909. This medal will be known as the "India General Service Medal, 1936," and will have a distinctive ribbon (khaki centre, flanked on each side by a narrow red stripe and edged with broader green stripes).

His Majesty has commanded that the "India General Service Medal, 1936," with clasp "North-West Frontier, 1936–37," shall be granted to the forces which were employed in the operations in Waziristan during 1936–37.

FOREIGN

GERMANY

During August and September, 1938, army exercises, amounting to a state of semi-mobilization for war, were carried out on an unexampled scale in Germany.

Over one million reservists were called up to the Colours, and from 15th August to 5th September each of the 52 Divisions of the German Army carried out divisional training in its own area. From 5th September onwards, eighteen Army Corps were engaged in combined training within each corps, and the foreign military attachés attended the manœuvres on 15th September and subsequent dates in East Prussia.

The German predilection for and skill in the production of heavy artillery were exemplified at the parade held on 25th August at Berlin in honour of Admiral Horthy—Regent of Hungary, where a battery of mobile 10-in. guns marched past Herr Hitler.

These weapons, which are believed to be the largest guns ever mounted on mobile carriages, are estimated to exceed 30 feet in length and to have a range of over twenty miles; they are transported on five huge trucks, one carrying the barrel and the others the mounting, recoil mechanism, wheels and equipment.

Herr Hitler payed a two-day visit to units of the II Army Corps, who were in training at Grossborn, in Eastern Pomerania under the command of General Blaskowitz. The greatest reticence was maintained regarding this visit, but the Führer, it is understood, took a keen personal interest in the technical side of the exercises. He was attended by General von Brauchitsch—Commander-in-Chief of the German Army, and General von Rundstedt, Commander of the 1st Army Group.

Work on the western defences of Germany has been carried out at the highest pressure, and over 400,000 men are alleged to have been conscripted for this task, the early completion of which is regarded as essential for the security of the Reich.

Wide areas of the country have been prohibited for the movements of foreign officers and other ranks on the active list and were defined as follows:—

(*a*) The whole of the area from the left bank of the Rhine to the frontier.
(*b*) A strip of country about 62 miles wide on the right bank of the Rhine from the River Main to the Swiss frontier.
(*c*) All German territories to the East of the River Oder.
(*d*) The islands of Borkum, Nordeney, Heligoland and Sylt; towns and rural areas of Wilhelmshaven and Kiel.
(*e*) Certain districts in East Prussia.

These restrictions did not apply to through railway travel or to travel by recognized air lines provided that passengers did not leave the aerodromes. In this connection, the War Office announced that all members of the public who showed a

military rank on their passports should, before starting for Germany, obtain a special certificate stating that they were not on the active strength of the regular forces.

On 1st October and subsequent dates, following on the decisions of the Four-Power Conference at Munich, troops of the Reichswehr (8th Army Corps—Commander, General von Reichenau) marched into the Sudeten-German districts of Czechoslovakia and formally incorporated these areas in the German Reich.

UNITED STATES

The U.S. Army is undergoing an extensive overhaul, and thorough measures of reorganization and re-equipment are being rapidly pushed through.

The enlisted strength of the Regular Army has been raised from 100,000 to 165,000 men. At the same time, the establishment of Divisions has been vigorously cut down to about half their former strength. Owing to the introduction of the Garand semi-automatic rifle, however, these smaller Divisions are capable of a far higher rate of effective fire.

This weapon was perfected by Mr. John Garand, of Springfield Armoury, in January, 1936, as the result of a lifetime of experiments. Some details are as follows: the rifle is semi-automatic and the energy developed by the explosion of the charge is utilized to perform all the actions of opening the breech to extract the spent case and closing it again to load in a fresh cartridge from the clip magazines.

One shot is fired each time the trigger is pressed. The average trained soldier can get off 50 aimed rounds a minute, while highly skilled N.C.Os, such as instructors at Small Arms Schools, can fire up to 80 aimed shots a minute. The calibre is 0.30 in.

The life of the barrel is said to be 8,000–10,000 rounds, and of the body mechanism well in excess of 100,000 rounds. The rifle, without bayonet, weighs about 9 lbs.; the length is 43 inches from muzzle to butt-plate.

A novel feature is incorporated in the back sight, which includes a clicking mechanism to allow of adjustment by ear; each click represents a rise or fall of 25 yards.

The rifle, which has been severely tested, is claimed to be fully capable of withstanding the conditions of active service and requires only the most simple tools for cleaning and adjustment.

Armed with this weapon and supported by a powerful artillery, the new Division should prove to be a formidable fighting machine. The Division is organized in four echelons: a command, a reconnaissance, a combat and a service echelon.

Divisional Headquarters include, besides the G.O.C., one Brigadier to act as infantry adviser, inspector of training and general assistant to the Divisional Commander; another Brigadier commands the service echelon.

One squadron of mechanized cavalry forms the reconnaissance echelon.

The combat echelon consists of artillery and infantry. The infantry comprise three regiments each of three battalions and one M.G. battalion; a battalion consists of H.Q. and four companies, and numbers 604 of all ranks. The Brigade and the section have been abolished in order to simplify and quicken the execution of orders.

The fire power includes, besides the artillery, 3,996 semi-automatic rifles, 324 light machine guns, 36 heavy M.Gs, and 36 infantry mortars. The total strength has been fixed at 13,512 of all ranks, but this establishment is likely to be reduced to about 10,000 in the near future. and, in any case, is experimental only.

AIR NOTES

ROYAL AIR FORCE

Honours and Awards

The King has been graciously pleased to approve the following awards :—

Distinguished Service Order.—Wing Commander B. Ankers, D.C.M., Squadron Leader B. E. Embry, A.F.C.

Distinguished Flying Cross.—Flight Lieutenant G. E. Jackson, Flying Officer R. C. Waddell, Flying Officer (now Flight Lieutenant) R. C. F. Lister, Flying Officer (Acting Flight Lieutenant) T. B. de la P. Beresford, Flying Officer L. E. Cryer, Pilot Officer D. J. H. Lay.

Appointments

The King has approved the appointment of Air Vice-Marshal His Royal Highness the Duke of Gloucester, K.G., K.T., K.P., G.C.M.G., G.C.V.O., as Honorary Air Commodore of No. 501 (County of Gloucester) (Bomber) Squadron, Auxiliary Air Force; and of the Right Honourable Sir Kingsley Wood, M.P., Secretary of State for Air, as Honorary Air Commodore of No. 901 (County of London) (Balloon) Squadron, Auxiliary Air Force.

The following appointments have taken effect from the dates shown :—

Air Vice-Marshals.—A. W. Tedder, C.B., to Air Ministry, as Director-General of Research and Development, to date 20th July; H. M. Cave-Browne-Cave, C.B., D.S.O., D.F.C., to Headquarters, No. 25 (Armament) Group, Eastchurch, as Air Officer Commanding, to date 17th August; J. T. Babington, C.B.E., D.S.O., to Headquarters, R.A.F. Far East, Singapore, in command, to date 10th September.

Air Commodores.—F. P. Don, O.B.E., to Headquarters, No. 2 (Bomber) Group, Wyton, as Senior Air Staff Officer, to date 11th July; R. G. Parry, D.S.O., to Headquarters, Coastal Command, Lee-on-the-Solent, as Air Officer in Charge of Administration, to date 18th July; K. R. Park, M.C., D.F.C., A.D.C., to Headquarters, Fighter Command, Stanmore, as Senior Air Staff Officer, to date 19th July; R. M. Hill, M.C., A.F.C., to Air Ministry, as Director of Technical Development, to date 1st August; C. W. H. Pulford, O.B.E., A.F.C., to Air Ministry, as Director of Volunteer Reserve Expansion, to date 15th August; A. T. Harris, O.B.E., A.F.C., to Headquarters, R.A.F., Palestine and Transjordan, Jerusalem, in command, to date 13th July; G. B. Dacre, D.S.O., to R.A.F. Station, Halton, in command, to date 2nd September; C. D. Breese, C.B., A.F.C., to No. 18 (Reconnaissance) Group, in command, to date 19th September.

Group Captains.—C. B. Dalison, A.F.C., to R.A.F. Station, Eastchurch, in command, to date 22nd July; F. W. Trott, O.B.E., M.C., to No. 1 Air Armament School, Manby, in command, to date 1st August; M. B. Frew, D.S.O., M.C., A.F.C., to No. 23 (Training) Group, Grantham, as Senior Air Staff Officer, to date 2nd August; E. O. Grenfell, M.C., D.F.C., A.F.C., to R.A.F. Station, Leuchars, in command, to date 4th August; F. H. M. Maynard, A.F.C., to Air Ministry, as Deputy Director of Staff Duties, to date 9th August; I. T. Lloyd, to Headquarters,

No. 16 (Reconnaissance) Group, Lee-on-Solent, as Air Officer Commanding (temporarily), to date 17th August; F. E. P. Barrington, to Headquarters, R.A.F., Mediterranean, Malta, in command (temporarily), to date 26th July; E. O. Grenfell, M.C., D.F.C., A.F.C., to R.A.F. Station, Gosport, in command, to date 1st September; B. E. Baker, D.S.O., M.C., D.F.C., to R.A.F. Station, Leuchars, in command, to date 1st September.

Royal Air Force Expansion

The following is a summary of the progress made under the expansion of the Royal Air Force since the expansion programme was announced by Sir Kingsley Wood on 23rd June, 1938.

Since the 23rd June, 1938, approximately 653 pilots have been selected for the Royal Air Force. The number of airmen who have been entered from the same date totals some 7,736.

Some 13,444 men are still required to complete this programme and vacancies still exist in all branches, especially for wireless operators, electricians, instrument repairers and armourers.

Organization

New Formations.—The following were formed, or will form, on the dates shown:—

No. 21 (Training) Group, formerly "Royal Air Force, Cranwell," at Cranwell, on 1st December.

Station Headquarters, at Eastchurch, on 15th July.

Station Headquarters, at Detling, on 14th September.

No. 150 (Bomber) Squadron, at Boscombe Down, on 8th August.

No. 18 (Reconnaissance) Group, at Lee-on-the-Solent, on 1st September, and move to Donibristle on 1st November.

Fleet Requirements Unit, at Lee-on-the-Solent, on 11th August.

No. 2 Air Armament School, at Eastchurch, in No. 25 (Armament) Group, on 1st July.

No. 2 Electrical and Wireless School, at Yatesbury, on 1st December.

No. 5 School of Technical Training, at Locking, on 1st January. 1939.

No. 2 Air Observers' School, at Acklington, on 15th November, and will move to Pembrey (Carmarthenshire) in the summer of 1939.

No. 2 School of Technical Training (Apprentices), at Cosford on 15th July, and placed in the Training Command in No. 24 (Training) Group.

No. 29 Elementary and Reserve F.T.S., at Luton on 1st August.

No. 30 Elementary and Reserve F.T.S., at Derby on 29th September.

No. 31 Elementary and Reserve F.T.S., at Gloucester and Cheltenham on 29th September.

No. 12 Flying Training School, at Grantham, on 1st December.

No. 25 Maintenance Unit, at Hartlebury, on 1st September.

No. 4 Anti-Aircraft Co-operation Unit, at Seletar, in the Far East Command, on 1st August.

Nos. 2 and 4 Balloon Centres, at Hook and Chigwell respectively, on 4th August, and placed in the Fighter Command in No. 30 (Balloon) Barrage Group.

No. 905 (County of Surrey) (Balloon) Squadron, No. 906 (County of Middlesex) (Balloon) Squadron, No. 908 (County of Essex) (Balloon) Squadron, and No. 910 (County of Essex) (Balloon) Squadron, for recruiting purposes only, on 5th July, and placed in the Fighter Command in No. 30 (Balloon) Barrage Group.

TRANSFERS.—Headquarters, Maintenance Command, from the Air Ministry to Andover (temporarily), on 15th July.

No. 16 (Reconnaissance) Group, from Lee-on-the-Solent to Chatham, from 1st November.

No. 1 Air Armament School, from Eastchurch to Manby, on 15th August.

No. 6 Flying Training School, from Netheravon to Little Rissington, on 26th August.

No. 102 (Bomber) Squadron, from Honington to Driffield, on 11th July, and transferred to No. 4 (Bomber) Group.

No. 75 (Bomber) Squadron, from Driffield to Honington, on 11th July, and transferred to No. 3 (Bomber) Group.

No. 77 (Bomber) Squadron, from Honington to Driffield, on 25th July, and transferred to No. 4 (Bomber) Group.

No. 215 (Bomber) Squadron, from Driffield to Honington, on 25th July, and transferred to No. 3 (Bomber) Group.

No. 103 (Bomber) Squadron, from Usworth to Abingdon, on 2nd September.

No. 500 (County of Kent) (Bomber) Squadron, from Manston to Detling, on 3rd October.

Headquarters, Royal Air Force, India, from Simla to Delhi, on 11th October.

CHANGE OF NAME.—The name of the Royal Airship Works, Cardington, was changed to " Balloon Development Establishment " on 15th September.

EXERCISES

TROOP CARRYING.—A Valentia aircraft was employed from the 1st May to 12th August, 1938, for troop carrying and supply dropping exercises. The aircraft was allotted for these purposes to Aldershot, Southern, Eastern, Western, Northern and Scottish Commands.

The troop carrying, as in previous cases, was undertaken with a view to giving air experience to as many as possible of all ranks of the Army. In order to give experience to the maximum number of men, the flights were made to cover a period of not more than fifteen minutes duration each, and there were fewer than six cases of sickness among the 5,270 men carried during the season, excluding a number of men who were sick during two exercises which involved spending a much longer period in the air.

One of the latter exercises was the transportation of forty men of the 1st Battalion Coldstream Guards (in two parties of twenty) from Odiham to Catterick, to take part in a battle, while the rest of the Battalion travelled by road and sea. Of the first party some fifty per cent. were sick, but of the second party (who travelled immediately after lunch), none was sick. As the weather conditions were the same during both journeys, this seems to prove conclusively the value of letting the men have their meal before flying when undertaking a long journey by air.

The aircraft was attached to 159th Infantry Brigade (Territorials) from 25th to 30th July. More than 1,200 men were carried.

It is understood from the Brigade Headquarters that this has proved, and will prove of immense value in encouraging recruiting.

Dropping Supplies from the Air.—Three exercises were carried out with a Valentia aircraft during this year to determine the possibilities of supplying ground formations with rations, ammunition and other stores, by air. Exercises of this nature have frequently been carried out before by fitting commodities to parachutes which are released from bomb racks, but there has been an obvious disadvantage in that the amount or weight of supplies so carried must be extremely small, or else the number of aircraft required must be considerable. In one of the exercises this year an experiment, new in this country, was made to test the damage to various types of stores when dropped without parachutes. The advantage of dropping supplies in this way is that the maximum carrying capacity of the aircraft can be fully used, since only approximately twenty-five per cent. of the maximum load can be carried on the bomb rack. This latter exercise was carried out with the Scottish Command at Turnhouse aerodrome, and the supplies were dropped from varying heights, but it is clear that the least damage to supplies is sustained if the packages are dropped as low as possible, the aircraft flying as slowly as they can into the wind.

Of the supplies so dropped, tinned beef was only ten per cent. damaged; biscuits were broken but perfectly eatable, and sugar and tea were dependent only on proper wrapping for their safe arrival.

Finally, it is apparent that, owing to their weight, petrol and oil present a difficult problem if they are to be transported in large quantities by air, remembering that they must be dropped by parachute. The supplying of rations is much more satisfactory, since it was found possible to drop sufficient foodstuffs with one aircraft in one journey to supply 980 men for twenty-four hours, the more easily damaged goods such as condensed milk, jam and margarine, being dropped by parachute.

Personnel

Attachment of Foreign Officers for Courses.—Captain Amal Goker and Lieutenant Saim Arman, Turkish Air Force, are attending the Long Navigation Course at Manston, from 5th July; Captain A. D. Leite, Lieutenant M. P. M. de Barros, Second Lieutenant F. M. S. de O. e Sousa, Portuguese Air Force, to No. 3 F.T.S., South Cerney, from 10th August; Lieutenant F. J. R. D. Silva, Second Lieutenant J. S. C. Real, Portuguese Air Force, to No. 10 F.T.S., Tern Hill, from 10th August; Captain Sepahpour, Imperial Iranian Air Force, to R.A.F. Station, Hemswell, from 24th August to 6th September; Lieutenant Brandt-Moeller, Danish Royal Air Force, to School of Aeronautical Engineering, Henlow, from 29th August; Captain Mostafavi, Imperial Iranian Army, to R.A.F. Station, Upper Heyford, from 8th September to 20th September; Captain G. Lindberg, Swedish Air Force, to R.A.F. Station, Bicester, from 13th September to 20th October; Pilot Officer Mansp Suriya, Siamese Air Force, to School of Army Co-operation, Old Sarum, from 19th September.

General

1938 Air Defence Exercises.—The greatest British air manœuvres ever held began early on 5th August, and ended prematurely, owing to bad weather, on the 7th. About 925 aeroplanes took part, with 15,000 personnel, including pilots, crews and ground staffs, besides 17,000 anti-aircraft Territorials and 4,000 Observer Corps volunteers. No fewer than seventy-three of the eighty-one regular bomber and fighter squadrons composing the Home Defence Air Force were engaged, and

the number of the machines was nearly double the total strength three years ago. The biggest black-out ever tried in England took place over the Midlands and East Anglia.

In the past, major air defence exercises have been planned in connection with the defence of London, but this year the operational area was within the line Humber, Dover, South London, Andover, Evesham, Leamington, Rotherham, Humber, thus affording protection to the industrial centres of the Midlands and on the outskirts of London. There is no political significance in this, and the area of the operations was chosen for economy and convenience.

The Defending Force, known as Westland, consisted of twenty-three fighter squadrons, fourteen bomber squadrons, two anti-aircraft divisions and the Observer Corps. Its total strength in aeroplanes was 450. The fighter squadrons were stationed at Northolt, Duxford, Wittering, Debden, Biggin Hill, Digby, Hornchurch and North Weald, and the bomber squadrons at Sradishall, Waddington, Feltwell, Marham, Scampton, Honington, and Mildenhall. The dispositions of the ground forces about the operational area may not be disclosed.

The Attacking Force, known as Eastland, consisted of thirty-six bomber squadrons with a total strength of 475 aeroplanes. Every squadron in the attacking force was equipped with post-expansion aeroplanes.

This year for the first time the anti-aircraft gun command and communications were in full operation. The Balloon barrage was taken into consideration although no balloons were flown ; certain areas were assumed to be covered by the barrage, and any formations flying through these areas were assessed by the umpires as having lost one machine in four.

Probably the most important new feature this year was the number of new types of aeroplanes used. Experience was gained in operating machines under conditions approximating to active service, and the greatly increased speed presented new problems to the ground forces and called for new tactics from the fighters. Intercepted enemy formations were allowed to go on to their targets so that as much training as possible could be given to the defence ; certain spectators may have thought that an alarming proportion of attacking aeroplanes was getting through the defences.

The operations were postponed from 10 a.m. until 2 p.m. on the 5th because of bad weather ; the weather then was still poor and the Eastland plan had to be modified. In spite of this, fifty raids were made on Westland, two-thirds of which were declared to have been intercepted, and the defending bombers made twenty raids between 6 p.m. and 8 p.m. The plan for mass attacks was altered to attacks by single machines and small formations, again because of the weather, and these attacks, mostly on Midland towns by fast medium bombers, were highly successful. Many raids during the night were cancelled or recalled owing to the weather.

A raid by twenty-two Fairey Battles soon after 5 p.m. bombed the Secretary of State for Air and members of the Staff who were visiting Hornchurch. The Air Minister moved on to Whitchurch where he was again attacked by three Whitleys, who in turn were attacked and destroyed by a formation of Hurricanes from Northolt.

During the evening of the 5th, thirty Blenheims attacked Bassingbourne, Cranfield and Wyton, and the railway-cutting at Great Rissington, and eleven Battles bombed Abingdon and Harwell. On the night of 6th–7th August, London was the object of a succession of attacks by single machines. At 1.30 a.m. on the 7th, the fog became general and the bombers were recalled, but the fighters went on until nearly 5 a.m. to exercise the searchlight units. Operations were resumed

at noon on the 7th, but heavy rain spread over the whole area and the Exercise was cancelled at 2.15 p.m.

The official report ends: "Throughout the period of the Exercise the weather has been bad, and several postponements have been necessary. Despite this handicap, the Fighter Squadrons, Searchlights and Observer Corps of the Westland Defence organization have been thoroughly tested, and many valuable lessons have been learned. The Bomber forces have been operating and taking every advantage of the weather conditions both by day and by night, and the crews have obtained practice under warlike conditions."

BALLOON BARRAGE EXERCISE.—The return of the units of the Balloon Barrage to a peace footing was marked by a skeleton training exercise on Saturday, 8th October, which showed some of the balloons to the London public.

There was no attempt at concentration such as would be needed in an air defence scheme; nor were the crews concerned with getting their balloons up to great heights, the altitude at which they were flown varying from 4,000 feet to 7,000 feet. Cable was reeled in or paid out by the winches as the cloud-base became lower or higher.

Five balloons broke away from their moorings, but all were recovered except one, which drifted as far as Denmark. These mishaps in a newly formed corps, drawn from the civilian population, were not surprising, and for every balloon which got out of hand there were nine or ten which were successfully handled. So few losses, at a time when the crews are only partly trained, may be taken as an encouraging sign. As they become more expert they will advance to the more intricate tasks of flying their balloons in close formation.

The barrage is to be strengthened by the creation of new units, and the immediate plan provides for a total of six hundred balloons to serve London. Each balloon, with its lorry and its trailer loaded with hydrogen cylinders, is completely mobile. The balloons will be used to set defensive cables in different places about London or around vital points in London in patterns suitable to the particular purpose; similar defences will be prepared for other important centres. Their effect will be to keep raiders high so that accurate bombing becomes more difficult and anti-aircraft attack is rendered more easy.

BRITISH AIR MISSION TO CANADA.—The following statement was issued by the British Air Mission to Canada in Ottawa on 2nd September:—

As a result of exhaustive discussions, arrangements have been made by the United Kingdom Government in conjunction with the principal firms in the industry in Canada supported by prominent financial organizations for the placing of contracts for bomber aircraft for the United Kingdom on a long range programme of purchases. Under the arrangements the aircraft firms will augment their existing capacity to manufacture mainly aircraft components, with two new central factories which they will build for this purpose, one at Montreal and one at Toronto.

A central company is to be formed in association with these firms which will operate the two main establishments and contract directly with the United Kingdom Government. Subject to approval of the arrangements by the United Kingdom Government, the new company will be finally constituted and enter into contracts with that Government to cover the long range purchase programme.

The United Kingdom representatives are also discussing with the Canadian aircraft firms, subject to confirmation, arrangements for placing contracts for manufacture of other types of aircraft for the United Kingdom Government at other centres, e.g., Vancouver and Fort William. Such arrangements, which would be

supplementary to those already obtaining under which a number of Canadian firms manufacture aircraft of British types for the Canadian Government, would involve the erection of additional manufacturing plant by firms at those centres.

These arrangements, as stipulated by the Canadian Government, in accordance with usual practice of Governments in a like situation, will preclude any possibility of prejudicing that Government's existing or future contracts with Canadian manufacturers for supplying needs of Canadian military forces. It was also the desire of the Canadian Government that all United Kingdom Government contracts and all arrangements in that connection should be made directly between the United Kingdom Government and Canadian firms. The United Kingdom Government accordingly have entire responsibility for placing of such contracts and all incidental arrangements. The Canadian Government have been duly informed of the progress made with the arrangement as here outlined.

ROYAL AIR FORCE VOLUNTEER RESERVE

CIVILIAN WIRELESS RESERVE.—In a statement issued on the 31st August by the Secretary of State for Air, it was announced that arrangements have now been completed for the formation of a Civilian Wireless Reserve, to be later incorporated in the Royal Air Force Volunteer Reserve. The object of the new organization is to build up an adequate and efficient reserve behind the Signals Branch of the Royal Air Force, which would be immediately available for service in an emergency.

The recruitment and training of these reservists, who would be drawn from the large body of wireless amateurs in this country, will be under the direct control of the Director of Signals, and the organization will be based on the sub-division of the country into areas, regions and groups.

Training will, for the most part, be undertaken by the volunteers at their homes on their own sets. It will consist of regular exercises broadcast direct from the Air Ministry or the Electrical and Wireless School at Cranwell. Occasional attendance at Royal Air Force stations and reserve centres will be necessary.

OVERSEAS COMMANDS

FLIGHTS

NON-STOP FLIGHT TO EGYPT.—A formation of four Vickers "Wellesley" aircraft of the Long Range Development Unit of the R.A.F., successfully completed a non-stop development flight of 4,300 miles on 8th July. This was the longest non-stop flight that has been accomplished by an organized unit of the Royal Air Force.

The four aircraft left Cranwell at 4.15 a.m. (BST) on 7th July, and landed at Ismailia, Egypt, at 12.10 p.m. (BST) on 8th July, after flying non-stop to a point between Kowait and Bahrein on the Persian Gulf, where, according to plan, they turned westwards to their destination at Ismailia.

The total time in the air was approximately thirty-two hours and the average ground speed 135 m.p.h. The aircraft flew at an average height of 10,000 feet, and the weather, on the whole, was good, and as forecast. No technical difficulties were encountered throughout the flight.

This development flight was organized in accordance with the policy announced towards the end of last year, that a Long Range Development Unit had been established with "Wellesley" aircraft for the investigation and development of the

technique of long range flying in relation both to operational purposes and to the design of aeroplanes. A large number of flights of considerable duration and distance have taken place in the interval around Great Britain.

The four aircraft remained at Ismailia until the 21st July, when they returned to England. The aircraft left Ismailia at 4 a.m. (BST), and arrived at Upper Heyford (Oxford) at 8 p.m. (BST) on the 22nd July. It is intended to arrange for further experimental trials of this nature, also along the England-Australia route.

ADEN

UNREST IN SUBEIHI COUNTRY.—With the conclusion of the operations against the Mansuris on the 30th April, it was hoped that a period of peace and security might result. The Mansuris, however, and their neighbours the Somatis, resumed their interference with traffic on the Mafalis road, and it was again necessary to warn the tribes that the Government intended to safeguard this route by air action if necessary. The usual bombing warnings were issued on the 4th July after the expiry of the customary ultimatum to the tribal leaders, and bombing commenced on the 6th July and was continued throughout the month.

The protracted nature of these operations is partly due to the difficulty of locating the tribes in their hiding-places in the hills, where thick scrub and caves provide ideal cover for them and their stocks. A further difficulty, in addition to the nature of the terrain, is that recent rains have provided small pools as an alternative water supply, so that air action against wells is less effective. An added complication is that the Mansuris' territory adjoins the Yemen in certain places, and as the frontier is, in this area, poorly defined if at all, the segregation of Mansuri territory proper becomes difficult. Valuable assistance was provided by the Sultan of Lahej which took the form of providing escorts for political and intelligence officers and detachments at Am Riga and Dar Kudemi in connection with the convoy system between these two places.

It is not anticipated, however, that these operations will be much further prolonged as there is evidence that the tribes are anxious for an early settlement. Four sub-sections of the Somatis have already surrendered hostages and agreed to pay fines as the result of an endeavour to reach an independent settlement with this tribe.

INDIA

SITUATION IN WAZIRISTAN.—Recent disorders in Waziristan have necessitated fairly large-scale air operations with the intention of enforcing tribal responsibility on certain prominent tribal sections which have been implicated in the recent disorders. These operations followed on the decision taken at the end of April that the main striking weapon in the enforcement and tribal responsibility was to be the Air Arm: the Land forces were to be supplementary, their action being limited to training column marches and, should suitable opportunities arise, small columns were to be used for punitive action in collaboration with Scouts.

The notorious Fakir of Ipi continued his anti-Government activities, and it was again necessary to take action against tribes harbouring him.

Further villages of the troublesome Madda Khel tribe were subjected to punitive air action and the area under proscription now included the two fertile valleys of Maizar and Kazha. As a direct result of the continuous pressure brought to bear on the tribes by the material losses sustained during this progressive plan of bombing, the tribe is now fully submissive and their losses in connection with the cultivation and reaping of their fields have been considerable.

At a fully representative jirga held on the 27th June, the tribe gave written assurance that the Fakir of Ipi was at Kharre, outside their limits. The jirga also stated that if the Fakir of Ipi returned to their country they would do their best to drive him out or settle with him, failing which they would ask for Government assistance. These air operations lasted for six weeks and involved over 2,500 hours operational flying during which time no case of forced landing occurred. The Fakir of Ipi has now been forced to move from the Kharre area to the mountainous country to the South of the Upper Tochi valley.

The operations against the Bahlolzai Mahsuds who have been harbouring Mullah Sher Zli, referred to in the last Notes, were similarly brought to a successful conclusion on the 20th May, when the tribe complied fully with the Government's terms. During July, however, it was established that this outlaw had been harboured by the tribe at the village of Sharkai, although the Malik who gave him food had insisted that he should eat it outside the village. It was therefore decided to make an example of this village by imposing destructive air action. Air action commenced after due warning on the 26th July. Fourteen flight raids were carried out by the 29th July, on which date air action ceased, adequate damage having been inflicted.

This purely punitive air action had a salutory effect on the Shaman Khel Mahsuds, whose jirga, though no terms were demanded, voluntarily paid Rs. 15,000 security on behalf of their principal hostiles and surrendered three relations of these as hostages. This operation occupied approximately fifty-five hours flying time.

THE DARGAI SAR INCIDENT.—The following details are of interest in connection with the attack, doubtless staged by Mullah Sher Ali and his gang, on the South Waziristan Scouts on the 14th April at Dargai Sar.

It appears that a detachment of these Scouts had been forced to retire on the Dargai Sar post at 11 a.m. by being considerably outnumbered by the enemy, and although in touch by heliograph with other posts they were cut off and surrounded. They therefore released a pigeon calling for air assistance. The message was received fifteen minutes after despatch and the detached flight at Miranshah were ordered to provide close support, this being the first warning given of air requirements.

One aircraft left Miranshah soon after noon fully armed with bombs and ammunition and arrived over the Scouts half an hour later. A second aircraft soon arrived on the scene and between 1 p.m. and 4.30 p.m. three aircraft were maintained over the area. Air action with bombs and machine guns in close support of the gasht was taken throughout the afternoon and evening, and it was reported that the enemy's casualties were very heavy.

A message was received by Popham Panel at 4 p.m. calling for first aid supplies. An aircraft's first aid outfit was immediately dropped and further medical supplies were dropped later on in the evening.

Soon after 4.30 the Scouts were running short of ammunition, being down to ten rounds per man, and a further message asking for ammunition was sent out. Four loads were dropped to the Scouts at 6.15 p.m. in spite of very heavy enemy fire.

The dropping of these supplies, which were augmented by a supply of Verey lights, put the Scouts in a satisfactory position for the night.

As a result of the combined action of the South Waziristan Scouts and the detached Flight of No. 5 (A.C.) Squadron on this day, the enemy gang is reported to have suffered a loss of eighteen killed and fifteen wounded, including some well-

known hostile leaders. The Scouts' casualties were four killed and died of wounds, and ten wounded. The strength of the enemy was approximately one hundred and fifty, which with reinforcements from local tribes during the day increased to about five hundred.

The Commandant, South Waziristan Scouts, expressed great appreciation of the most valuable assistance afforded by the Royal Air Force on this occasion. This incident is another illustration of the immense value of the Air Arm in situations of this nature, and the dangers inherent in column operations on the N.W. Frontier.

THE GERMAN NANGA PARBAT EXPEDITION.—During June and July, one R.A.F. officer has been officially attached for liaison duties to the flying party of this expedition. At the same time, Herr Dr. Bauer, the leader of the expedition, selected another R.A.F. officer to accompany the climbing party in a private capacity.

The flying party, together with their Junkers aircraft, have been based at Srinagar and several flights have been made to Nanga Parbat to drop supplies on the various camps of the climbing party. The expedition was unsuccessful in reaching the summit and monsoon conditions having broken over the mountain, the project has been abandoned for this season.

FOREIGN

BULGARIA

PURCHASE OF AIRCRAFT.—It is reliably reported that the Bulgarian Air Force recently ordered twelve Bucker " Jungmann " trainer aircraft from Germany.

The " Jungmann " is a two-seater biplane powered by a 100 h.p. Hirth engine.

DENMARK

DEFENCE EXPENDITURE.—Of the 50,000,000 kroner (approximately 2¼ million pounds) which was voted to purchase supplies for preparation in the event of war, plans have been made to dispose of 30,000,000 kroner. The Ministry of War will receive 4,000,000 for the purchase of sanitary goods and raw materials for war purposes, the Ministry of Marine 700,000 kroner for raw materials, and the Ministry for Home Affairs 6.4 million for medicine and hospital supplies, and for air defence. How much of this latter amount will be allocated for air defence is not divulged.

SHORTAGE OF PILOTS.—The Danish Press quotes Commander Grandjean, Chief of the Naval Air Force, as saying that the Navy has great difficulty in obtaining sufficient recruits as pilots. The stringent economy under which the Force is obliged to work discourages applicants, and the Navy has not sufficient men to spare for the Air Force.

FRANCE

REORGANIZATION.—The present organization, brought into being in 1936, of the French Air Force, provides for the separation of the operational from the administrative commands. All combatant aircraft are grouped into two air corps, one a fighter corps and the other a bomber corps. The General Officers Commanding these two corps and their subordinates are responsible only for the operational training of their units. All administrative matters, including supply, repair, rationing, pay, etc., are placed under the command of General Officers Commanding the four Air Regions into which the Metropolitan territory is divided, a Fifth Region grouping the Air Force in North Africa.

This organization, which is due to M. Pierre Cot and his Chef de Cabinet General Jauneaud, has now been in operation for nearly two years. The new regime at the Air Ministry, under M. Guy La Chambre, has come to the conclusion that it cannot work satisfactorily. It has been found that, in practice, much delay has been caused by the fact that, for instance, the officer commanding the operational units on a particular aerodrome has no control over the repair and supply units on the same aerodrome. If he has wished a repair to be carried out, it has been necessary to apply to his Corps Commander who has then got in touch with the Regional Commander who has instructed the Base Commander on the aerodrome concerned to carry out the repair required by the Escadre Commander whose office is situated probably not more than fifty yards from his own.

It has therefore been decided to revert to the organization which was in operation prior to October, 1936. The Corps are to be suppressed and the whole command, both territorial and operational, in a given area will be vested in the Regional Commander. Equally, the operational units on a given aerodrome will be grouped into brigades or demi-brigades, as the case may be, and the senior officer on any given aerodrome will be in command of all establishments of any kind on his aerodrome. The various formations in the Air Force will therefore in future be known as regions, sub-divisions, brigades, demi-brigades, escadres.

As regards the Army co-operational organization, which has during the last two years taken the form of Regional Air Groups, the new organization will substitute observation squadrons which will form integral parts of the Air Regions. These observation squadrons will still be located within the Military Regions, whose needs they serve, and their composition (consisting of a large proportion of reservists) will remain as in the past.

An Inspectorate of Fighter Aircraft and an Inspectorate of Bomber Aircraft will be set up, with the function of ensuring that operational training is kept up to the necessary standard.

It was proposed that the new organization will come into operation on the 1st October, 1938.

GERMANY

Visit of Marshal Balbo.—Marshal Balbo arrived at Berlin at 5.20 p.m. on August 9th, having flown from Tripoli non-stop in nine hours. He was accompanied by General Briganti, Chief of the Regia Aerunautica in Libya. He was greeted on landing by Field Marshal Goering and attended a reception given by General Milch in the evening. On August 11th he visited the Air Force practice camp at Zingst and saw heavy A.A. fire against low targets, live bombing from high altitudes and low flying bombing attack with defence by fighters; also dive bombing attack with defence by fighters and A.A. The programme lasted an hour. In the evening he gave an interview to the Press, and stressed his appreciation of the astonishing progress made by the German A.A.

On August 12th, he saw demonstrations of the latest types of German Aircraft at the Experimental Establishment at Rechlin, and the next day he flew to Munich where he was met by Rudolp Hess (Deputy of the Führer) and went to tea with the Führer at Berchtesgaden, where General De Flieger Sperrle was also present.

The Press Attaché at the Italian Embassy said this visit, and that of General Pariani, could be regarded as the Rome-Berlin equivalent to the Anglo-French Staff Conversations.

N.S.F.K. in Austria.—General Goering has allotted Gruppe 17 of the N.S.F.K.

(i.e., the Austrian Gruppe) a large number of aircraft from the equipment of the former Austrian Air Force. They will be used for communication units and for the National School of Powered Sporting Flying which is to be founded in Vienna.

HUNGARY

APPOINTMENTS.—General Rath, the Hungarian Chief of the General Staff, has been appointed War Minister in the new Cabinet. General Ludwig Keresztes-Fischer, formerly Chief of the Military Office of Admiral Horthy, has been appointed Chief of the Hungarian General Staff.

POLISH-HUNGARIAN AIR SERVICE.—The Polish Press reports the signature recently of an air agreement between Poland and Hungary which provides for the establishment of an air line between the two countries.

ITALY

ARTIFICIAL FOGS.—The following account has been received of an experiment carried out at Naples with artificial fog for the purpose of defence against air attack.

"The experiment was made on the 25th May between 5 p.m. and 8 p.m. The wind was light and caused the gas, discharged from special motor lorries to windward of the town to settle over the town and bay. At 6 o'clock, Naples, the Bay and mountains, including Vesuvius, could no longer be seen from Posillipo" (six miles S.W. of Naples—the observer would have been looking across the bay). "The artificial fog resembling natural fog, had no smell, and could be inhaled without any sensation of discomfort. It appeared to be completely effective as a means of concealment from air attack and remained until darkness set in."

NORWAY

PURCHASE OF ITALIAN AIRCRAFT.—A Military Air Force Mission has recently returned from Italy where a contract was signed for the purchase of the Caproni 310, a twin-engined light bomber carrying a crew of three and having a speed of 350 k.p.h. (217 m.p.h.). Four complete aircraft are to be delivered and twenty engines for fitment to ten twin-engined bombers. Licence rights for bomber aircraft and engines have been acquired. Payment is to be made chiefly by deliveries of codfish.

It is expected that the new bombers will be flown to Norway by the end of July, and that the first Norwegian built Capronis will be under construction at Kjeller in two months' time. The first five will, it is hoped, be ready in a year's time.

VISIT OF GERMAN TORPEDO BOMBER TO HORTEN.—A German torpedo-bomber, presumably the Arado 95, was recently demonstrated at Horten. An aircraft of this type was shown last year but, according to the Press, developments with this particular model have been so rapid that it has become an entirely different machine during the past winter. The Naval Command is said to be interested and trials with torpedoes are reported to have been arranged.

PORTUGAL

AIRCRAFT RE-EQUIPMENT.—Fourteen air officers have proceeded to Germany in order to accept delivery of the ten J.U. 86 Bombers which have been ordered. Before returning to Portugal these officers are to follow a specialist course, but no details are available.

Two other Commissions will be leaving Portugal in a few weeks' time, one to collect ten reconnaissance machines from Italy, the other to bring back fifteen pursuit planes from England.

REVIEWS OF BOOKS

GENERAL

Marlborough: His Life and Times. Vol. IV. By The Rt. Hon. Winston S. Churchill C.H., M.P. (Harrap). 25s.

The main interest of the fourth and concluding volume of Mr. Churchill's *Marlborough: His Life and Times*, is political and personal rather than military. This indeed is only natural, for if it covers Malplaquet and the forcing of Villars' *Ne Plus Ultra* lines in 1711, as remarkable an example of outwitting and outmanœuvring as history records, with several important sieges, these must yield first place to the gradual decline of Marlborough's position at home, which was after all the main basis on which his power to achieve great things in the field rested. If after the fall of Lille the fighting becomes rather an anticlimax, this was because Marlborough was losing his hold over the Queen and because the position of Godolphin and of their Whig colleagues was being steadily undermined by Harley's assiduous and skilfully conducted intrigues. The use made by Swift and others of his Tory enemies of the Malplaquet casualty list, exaggerating the British share in the loss, when actually our troops got off more lightly than the Dutch and most of the Germans, helped to make Marlborough cautious about fighting again, and both in 1710 and 1711 the new Ministers' constant interference in military appointments and promotions (cf. p. 335) was a serious handicap, while St. John's taking away of five good British battalions for the futile attack on Quebec contributed to prevent his following up the strategical success of forcing Villars' lines by the tactical success without which even that brilliant manœuvre was incomplete. Mr. Churchill quotes (p. 405) Wellington's well-known comparison of his own difficulties with those Marlborough encountered, when he remarked that, although the Dutch were perhaps more troublesome than the Spaniards and Portuguese, "I had most difficulties at home." Of the earlier years of both wars this was probably true, but whereas Wellington's position and authority improved as the war went on, with Marlborough the position was clearly reversed.

But if the campaigns get only a quarter of the book, Mr. Churchill's descriptions of Malplaquet and the forcing of the lines are vigorous and effective. He might have been fuller over the question whether the Allies were bound to fight at Malplaquet, and whether they should not have attacked a day earlier, before Villars had dug in, and he has missed some useful bits of evidence about tactical details to be found in the newsletters. These provide a source of which Mr. Churchill seems to have made little use, but a good deal can be gleaned from them. Thus, when Mr. Churchill rightly emphasizes the merits of the capture of Bouchain under the very nose of Villars and a superior force, he might have found in the *Postboy* a detailed journal of the siege which would have enabled him to give a clearer idea of its difficulties and of Marlborough's methods of siege warfare.

In Mr. Churchill's elaborate account of the fall of the Whigs and of the negotiations with France behind the back of the Allies there is much that invites discussion, and some over-statement. He has clearly enjoyed castigating Harley and Bolingbroke, of whom one hears almost more than of Marlborough; he certainly has a good case against them, though it is more the methods and manœuvres by

which the Peace of Utrecht was concluded than the actual terms of the settlement which have invested it with discredit. The Blenheim archives have enabled him to throw some new light on the peace negotiations of 1709, and it is now clear that Marlborough cannot be held responsible for their breakdown, though it is difficult to accept some of Mr. Churchill's claims and contentions about them, just as his very unconvincing effort (p. 375) to belittle the importance of the death of the Emperor Joseph I in 1711 as altering the whole basis of the war is one of the many things which leave the impression that, well as Mr. Churchill has got up his brief, his general grasp of the history of the period has its limits, and that he is inclined to extract more from his evidence than is really warranted. After a vivid description of the pressure put on the Queen to make her dismiss Marlborough (p. 503), he admits that there is " no direct record " of " these conversations," while St. John's letter to Lord Strafford, which he quotes, is far from adequate proof of what he believes to have been said. As before, he seems quite unable to fathom the mysteries of " the Empire " and its relation to the " Germanic (why not " German " ?) States " : he produces two " Electors of Cassel and Düsseldorf " (p. 531), titles quite unknown to history, and he credits the Protestant Frederick I of Prussia with aspiring to the Empire (p. 374). But what is to be made of the statement (p. 637) that in 1715 (apparently) the Swedish fleet, in which Charles XII had planned to come to Scotland —this was a much later scheme—was " attacked and destroyed by British battleships " under the Danish flag. British squadrons certainly visited the Baltic frequently during the years 1714–1718 to protect British trade against Swedish privateers, several of which were captured, while they co-operated with the Danes and Russians to coerce the Swedish fleet into remaining in harbour ; but of anything like this battle, which Mr. Churchill has apprently discovered, contemporary historians like Lediard seem to be unaware.

Considerable as are the merits of Mr. Churchill's biography as a whole, and valuable as is much of the new evidence unearthed at Blenheim, which in the main corroborates Coxe rather than supersedes him, it is unfortunate that the book should be marred by this tendency to go further than the evidence warrants, by constant carelessness over details, and by its prodigious length, which put it out of the reach of most people's pockets and time. The book would have gained by compression, for there is much repetition and even prolixity. Compression would have meant more care in selecting the really important new items ; whereas one feels that Mr. Churchill has been anxious to get in every bit of new stuff, and has often gone out of his way to deal with things which have too little direct connection with Marlborough to need detailed treatment. Thus, for example, four pages and a map have been devoted to the Allied campaign in Spain in 1710 : if this was to be done, Saragossa might at least have been on the proper bank of the Ebro, and Philip V's retreat after Almenara directed upon Lerida, to the gates of which Stanhope's victorious squadrons had chased him before darkness stopped their pursuit, while anyone who looked for Talavera " 70 miles *South* " of Madrid (p. 349) would have a long search. Minor errors, especially over the personnel and interior economy of the Army, are avoidably frequent. Thus the intriguing Tory, Orrery, one of Mr. Churchill's minor villains, was not promoted to Major-General in December, 1710, when Honywood, Macartney and Meredith were cashiered for drinking damnation to the new Ministry, though he then obtained command of the Scots Fusiliers, vacated by Meredith : a glance at Dalton's *Army Lists* would have shown that Orrery had been promoted to Major-General in August, and that another Tory soldier, Lord North and Grey, whose regiment is now The Lincolnshire, was one person and not " two other Generals, Lords North and Grey " (p. 339).

It may be objected that Mr. Churchill's theme is not Marlborough's army, but the man. Still the *Life and Times* of a great commander, especially when it runs to four such substantial volumes and ranges so very wide, might have found more space for such things as the recruiting, the equipment, the provisioning and the general administration of the Army. There is ample material in the Record Office from which the necessary information might have been extracted, but the only evidence in the Record Office mentioned in the bibliography is the Secret Service Accounts, though the text contains one reference to the State Papers, Holland, another source of which one would have expected more use to be made. Possibly modern warfare, with its new weapons, the aeroplane and the motor, has rendered the study of Marlborough's campaigns of little value to the military student, though the life of a great commander and leader of men can hardly be without some lessons; but anyone interested in the history of the British Army and of those of its regiments whom Marlborough led to victory will regret that in so voluminous a work one hears so little of the instrument which Marlborough handled so skilfully and appreciated so highly.

The Men who Defend Us. By Commander Russell Grenfell. (Eyre and Spottiswoode). 9s.

From time to time the conditions of service on the lower deck in the Navy, or in the rank and file of the Army or Air Force—of which one of the most important is the level of pay—is brought forcibly to the notice of the Government and the country by incidents such as those at Spithead and The Nore in 1797, or Invergordon in 1931. In the intervals between such occurrences it has become a national habit—which is reflected by the action, or rather inaction, of Parliament—to ignore the influence of normal social developments upon the needs of the Defence Services. The tendency was pointed out many years ago by Kipling in a well-remembered ballad; Commander Grenfell has attempted the same task to-day, not in verse but in a temperate and closely argued analysis of the whole subject of Service remuneration.

The subject is intricate, as all serving officers and men know, and as is well illustrated by the mass of figures, often irrelevant, adduced in opposition to any Service claims for betterment whenever it becomes the subject of "Letters to the Editor" in the Press. For that reason it is not easy to interest the public in it, for nothing can be so dry as a mass of figures. But Commander Grenfell has avoided the trap of too great detail, and has succeeded in presenting a strong, if not unanswerable, case for the revision of the whole system of Service remuneration.

Some of the results of his investigation will be somewhat startling to the layman who has no previous acquaintance with conditions in the Services. It hardly seems logical, for instance, that the pay of a seaman, who to-day has to be an expert in many things—such as handling machine guns, torpedoes or the intricate calculating instruments used in the control of gunfire, in working high-speed boats or maintaining delicate electrical apparatus; or of the private soldier, who besides handling a rifle and bayonet must be a skilful individual tactician and an adept at handling mechanical transport, should be fixed on the basis of the wages paid to the lowest-paid class of unskilled labourer. Yet it is so. For the rates of pay enjoyed by the Services—both officers and men—are still governed by the report of the Anderson Committee of 1923 which adopted that basis. Commander Grenfell therefore analyses that report with great care and thoroughness, and has no difficulty in demonstrating to any fair-minded reader the injustice of the conclusions it contains.

For instance, the Committee decided, in the face of representations to the contrary from the Admiralty, that the rates of pay ruling in the Navy in 1914 had been adequate—not from any comparison with the improving standard of living outside the Navy, for basic rates of pay had not been increased for fifty years, but on the grounds that they must be, since the Navy got all the men it needed! This argument has been heard before in other circumstances; but it has never been held to justify, for instance, the action of employers of sweated labour, it is difficult to understand why it should be held to be of overriding validity when used on behalf of the Treasury. Then again, in order to justify the rates of pay recommended, the Committee placed on the accommodation provided for the soldier and sailor a money value which is fantastically unrelated to real conditions. Under the Agricultural Wages Act of 1924, a farmer is not allowed to charge one of his labourers more than 3s. a week for the accommodation he provides. Yet the figure reached by the Committee " means that for a hammock and a seat at a mess table, the State has been charging a bluejacket exactly four times the amount that it has been allowing the farmer to charge one of his labourers for a whole cottage." Officers' emoluments are assessed on the same basis; yet, as Commander Grenfell pertinently observes, if a battleship were moored in the Thames, it is difficult to believe that the Treasury would get £38,000 a year rent for the officers' and men's accommodation in open competition with ordinary housing accommodation ashore; yet that is the rate at which officers and men are being charged. Moreover, on reflection, it seems hardly equitable in time of war to charge them for the privilege of living on top of 1,000 tons of explosive which enemies are doing their best, sometimes successfully, to blow up.

In the matter of officers' remuneration, Commander Grenfell compares their lot with that of the civil servant, and remarks very pertinently on the tenderness displayed by the Anderson Committee for the interests of the latter compared with the rigour of its treatment of any claims urged on behalf of the fighting Services. He pillories the Committee's pronouncement that the naval officer, so far from being paid in accordance with his heavy responsibilities, ought to regard it as such a privilege to be allowed to assume them that he should be satisfied with less pay than his contemporaries in other walks of life. He comments on the incongruity of paying the Commander-in-Chief of the principal fleet—described by Mr. Winston Churchill as " the only man on either side who could lose the war in an afternoon "—less than the Permanent Secretary of the Admiralty who has no direct executive responsibility at all. And he analyses the whole subject of Service pensions to show that the value officially placed on them is greatly in excess of their real value.

This book is particularly valuable in that serving officers and men are precluded by the traditional discipline of the fighting Services from urging their own case, or from taking any of the means open to those in other professions to better the conditions of their employment. The author is, of course, not infallible, and there are some of his arguments and conclusions which even those who have at heart the cause for which he is fighting would not endorse. But his arguments are cogent and are presented logically, temperately and without heat. The cost of the measures he recommends to put Service conditions on what he urges as a fair basis is probably prohibitive; but the case he makes for substantial betterment, even though of a degree less than his own scheme, is unanswerable. The book should be in the hands of all Members of Parliament who have the welfare and efficiency of the Services at heart.

NAVAL

Jellicoe. By Captain E. Altham, C.B., R.N. (Blackie & Son, Ltd.). 5s.

The moderate price of this book puts a life of Jellicoe within the reach of those to whom the cost of Admiral Bacon's biography was prohibitive. Anyone who wants to make a full study of his great work in the War, with the Grand Fleet as a whole, at Jutland, or in defeating the submarine menace, will naturally have recourse to more exhaustive works, but this short biography gives all the essential facts of Jellicoe's career.

A short biography demands much condensation and omission. Satisfactory condensation is difficult; but Captain Altham has been very successful in this respect. His account of Jutland, in particular, is excellent; just sufficient detail is kept to give an ordinary reader a complete picture without confusing him. The author shows the problems which confronted Jellicoe as they were presented to him before and during the action; by which alone can his actions be judged. It brings out clearly how in an unavoidable and almost complete ignorance of the enemy's movements, the intuitions and deductions of a supreme judgment and experience enabled Jellicoe to confront his opponent throughout the day with an unbreakable barrier of tactical superiority. For bringing the fleets together before the action and ensuring that action should be joined, Beatty is given the fullest credit, although many of his actions and omissions while doing so are criticized. The author demolishes the ill-informed criticism of Jellicoe's handling of the situation after dark, and exposes unsparingly the true causes which frustrated his attempts to turn his success into an annihilating victory—the repeated failures to accept or recognize individual responsibility, which, though deplorable, admit of extenuation, and the crowning and inexcusable error at the Admiralty which ensured the escape of the German fleet.

The account of Jellicoe's work as First Sea Lord—work which actually won the War—is mostly a plain statement of facts. The reader can choose between believing the author or the man who not only denied credit where it was due but tried to filch it for himself. By now he should at least automatically disbelieve the latter.

Captain Altham deals fully and trenchantly with the many intrigues and the ingratitude towards Jellicoe which disgraced many of our years after the War. His account of these may be a shock to many who, though they by now realize Jellicoe's high qualities, are still deceived into thinking that he failed to achieve greatness on account of defects of which he was falsely accused. In his final chapter, "Retrospect," the author brings out some of the human characteristics which were such an important part of Jellicoe's influence. The reviewer only wishes that he had given us, throughout his book, more of the apparently trivial anecdotes of habits and behaviour which shed so much light on Jellicoe as a man, and help to explain the universal affection, devotion, and confidence which he evoked throughout the Navy as a whole.

A short biography such as this was wanted for two reasons: to let his fellow-countrymen know what a man they had and how much they owe to him, and to hand him on to our youngsters of this and future generations as a model for emulation. One book cannot as yet do both things. Although Jellicoe's fame is now established and secure, traces of poison gas still linger and its effect is not completely eradicated. A biographer still has to justify his statements and disprove the lies of yesterday. But for a youngster's story of a hero polemics are out of place. The boy's Life of Jellicoe has still to be written, but Captain Altham has given us the other book we wanted. Those who read it will now know the Jellicoe we knew:

the supreme master of his profession—". . . . A lovely humanity. A great sailor . . . and a great man."

Naval Reminiscences. By Admiral Sir Frederic Fisher, K.C.V.O. (Frederick Muller, Ltd.). 12s. 6d.

His many old friends and admirers (including his numerous nieces) will welcome "Uncle Bill's" Reminiscences. To the older generation they will recall scenes and personalities of their youth; and to the Navy of to-day, with its strenuous routine and its big fleets, it will bring a breath of the freedom and romance of life at sea fifty years ago and more. Yet, with all the scope for adventure, it was tough living afloat when the author was a young officer, and underneath the light-hearted anecdotes which form the bulk of the book, it is easy to detect the stout hearts of the men who manned the little ships of those days.

But, especially, the reader will appreciate the very human outlook and the cheerful and generous spirit with which the writer is endowed.

Coronel. By Keith Phillips. (The Favil Press). 5s.

Those who like their history served up in a mixture of blank verse and rhyming, interspersed with patches of prosaic prose, may find this little account of the battles of Coronel and the Falklands lighter reading than previous publications on the subject.

Full allowance should, however, be made for "poetic licence," and an obvious lack of technical knowledge precludes the book being taken seriously. For instance, Cradock is made to allude to the old battleship "Canopus" as a "fortress," whereas, with her thin armour and short-range guns, she was merely an additional liability with which he never ought to have been burdened. Coronel remains a tragic record of inefficient staff work at the Admiralty, and the Falklands a lasting monument to the strategic genius of the man who "cleared up the mess"—Lord Fisher.

The Naval Calendar. Edited by Paymaster Lieutenant-Commander E. C. Talbot-Booth, R.N.R. (Sampson Low, Marston & Co., Ltd.). 7s. 6d.

This little pocket-size volume gives the essential details of the ships of the world's navies. It is, in effect, a kind of miniature *Jane's Fighting Ships*, and has the merits of being cheap and compact; but it cannot, of course, be regarded as being in any way a substitute for the bigger publication—which is unique of its kind.

Photographs depict some hundred of the more important types.

MILITARY

Official History of the Canadian Forces in the Great War, 1914-1919. General Series, Volume I. By Colonel A. Fortescue Duguid, D.S.O., Director of the Historical Section, General Staff. (Department of National Defence, Ottawa). $2. Chronology, Appendices and Maps, $1.50.

If Canada has, in point of view of time, been behind the Australian Commonwealth in producing the official record of her forces during the World War—although it should not be overlooked that the history of her Medical Services by Sir Andrew Macphail was published in 1925—she can justly claim that the past two decades have served to give the vintage of that record something of the maturity that years alone can supply. For the first volume now before us bears the evidences of meticu-

lous research, careful selection, scrupulous impartiality and no mean professional acumen; moreover, the narrative, though never dramatized, is neither dull nor colourless. There is every promise that the work when completed will, indeed, fulfil its avowed purpose of being "a memorial for participants, a source for historians, a manual for soldiers, and a guide for the future."

This, the initial instalment, is divided into two parts. The one deals with the story up to the formation of the Canadian Corps in France in September, 1915, and includes the organization, assembly at Valcartier, sea transportation, and training in England of the First and Second Divisions; the operations of the First Division in Flanders are also related. The other part consists mainly of Appendices—there are 855 in all—which are referred to by numbers in the main text, thus avoiding the distraction of footnotes in the latter. Maps, for which Captain J. I. P. Neal of the Royal Canadian Engineers is responsible, are lavishly provided to illustrate the fighting, while there are plans of the camps at Valcartier and on Salisbury Plain—by a slip the River Wylye in the latter is spelt as Wiley in the text.

It is sufficient comment on the effort of the Dominion to recall that she enlisted no less than 628,462 men, of whom 424,589 served overseas and 60,661 returned no more. There were, too, munificent gifts in kind to the Mother Country both by the Dominion Government and the several provinces—in August, 1914, for instance, the former presented a million bags of flour, while the latter vied with each other in donating oats, coal, cheese, potatoes and salmon. How swiftly the nation rallied to the crisis may be gauged from the fact that the advance parties of the first Contingent reached Valcartier on 10th August. The Contingent itself, of 31,000 men, was in England on 14th October, in France by 15th February, and in the line in the Fleubaix sector on 3rd March, 1915. And hard on the heels of the first Contingent the second was raised in Canada. In all, fifteen chapters out of twenty are devoted to operations, the high light of which was, of course, the Second Ypres, from 22nd April to 3rd May, 1915, when gas was for the first time in war introduced by the enemy. In that fighting, of which the most detailed account is given, the Canadian infantry alone suffered 4,500 casualties, but they proved that they were ready to defend to the death the last few miles of shattered Belgium. And what was still more, they became convinced in their minds that "they were equal to the best soldiers in the world." That was no vain assumption; it was shared by all who fought beside them. The pace had been set and, as fresh reinforcements and divisions came to join the pioneers of Canada's manhood in Europe, the same feeling of superiority pervaded all and the confidence thus engendered was confirmed in every subsequent action—on the Somme, at Vimy, at Passchendaele, at Amiens, in the Arras–Cambrai battles, at Valenciennes and in the pursuit to Mons.

It is a matter of nice selection to lighten an official relation of facts, which are the simple residue after the intricate process of sifting and testing vast masses of material, with episode and incident concerning individuals. In this last respect Colonel Duguid has been successful in his touches. He gives, for instance, brief outlines of the careers of officers nominated for important positions—we learn of Lieut.-Colonel A. W. Currie, who was appointed to command the 1st Infantry Brigade on 1st September, 1914, among others who subsequently distinguished themselves—and of instances of special individual gallantry. Nor is Sir Samuel Hughes, the unorthodox Minister of Militia, whose initial interview with Lord Kitchener was so dramatic, left without his share of notice.

The author pays handsome tribute to those associated with him in the production of an epic story which will surely be as great a source of pride to every Briton as it will be of inspiration to generations of Canadians yet unborn.

The Development of the British Army, 1899-1914. By Colonel John K. Dunlop, O.B.E., M.C., T.D., Ph.D. (Methuen). 10s. 6d.

Professional soldiers will welcome and study a book dealing with changes in the higher control and administration of the Army, and by its title emphasizing that those changes were not any sweeping away of corruption and imbecility, as ignorant prejudice sometimes assumes, but a forward move in the healthy and continuous growth and development of an organization essential to the safety and well-being of the British Empire. In this respect Colonel Dunlop's work might, were it not for an intervening gap of six years, almost claim to be a continuation of the valuable and most reliable *Army Book of the British Empire* written by Lieut.-General Sir W. H. Goodenough and Lieut.-Colonel J. C. Dalton, and published by the War Office in 1893. Such a continuation would, moreover, have given the author the advantages of official help in presenting to the reader a really accurate record of the evolution of the General Staff of the British Army. Not that the book as published can in any way be charged as inaccurate in statement of facts, but, though it records fairly enough the vigour of the Intelligence Division under Sir Henry Brackenbury at Queen Anne's Gate, it omits reference to that department's remarkable further development and increase in status under Lord Roberts and Sir William Nicholson.

The old Intelligence Division under General Brackenbury had undoubtedly done admirable work and acquired considerable status in the War Office, and, too, with the Foreign Office and Colonial Office as their semi-official advisers in military matters, but its location at Queen Anne's Gate, and the anxiety of Lord Wolseley to retain close personal touch with the Adjutant-General's and Quartermaster-General's Departments, recently removed from his direct control, militated against his making full use of Sir John Ardagh's representations and warnings in the period immediately preceding the South African War. It is regrettable that Colonel Dunlop in his history of the development of the Army during the years 1899–1914, omits to record that Lord Roberts, soon after his accession to the office of Commander-in-Chief, moved the staff of the I.D. to Winchester House—a stone's throw from the War Office, then in Pall Mall, enlarged and emphasized its strategic responsibilities, increased its personnel, raised the official status of its staff, linked up with it the Mobilization Division, and appointed as Director-General of Intelligence and Mobilization Sir William Nicholson—an officer who enjoyed his entire confidence and possessed the best brain in the Army of that day.

It is as well too to recall the fact that though on the Esher reorganization Sir William Nicholson was with the scantiest courtesy turned out of the War Office with but twenty-four hours notice, on the plea "New measures, New men," and a General Staff officially created with much sounding of trumpets, that General Staff did not miraculously emerge ready equipped and organized from the Committee's brain, but was very simply formed by coupling together in one department the old Intelligence Division and a newer Training Division which had been added by Lord Roberts in 1903 to the A.-G.'s department, and reserving for this combined body the use of the title "General Staff," hitherto regarded as the privilege of all the combatant staff of the Army. It is only fair, too, to bear in mind that the strategic section of this new creation was in personnel and definition of its duties identical with the strategical section of the old I.D.: not a single officer was changed, not a syllable of the official definition of their duties was altered; the same staff continued to perform identically the same duties, but with a change of title. The "New men, New measures" criterion was, in fact, applied only to the heads of departments. It seems to have been based on a belief that the Secretary of State could attain Army reform best if provided with an entirely new band of colleagues. Yet Colonel

Dunlop's record of War Office achievement in the years immediately following the Esher " purge " tends to show that the winning courtesy of the blushing Haldane bride to her " bearded warrior husband " was infinitely more fruitful in result than the rude abruptness of the " New measures, New men " cry.

As to one other item only, however, can the accuracy of Colonel Dunlop's narrative be questioned, and that is its inference that the Committee of Imperial Defence only came into existence after the sitting, and as a result of, the Esher Committee. The substitution of a Prime Minister's Defence Committee of specially selected naval and military advisers for the old Cabinet Defence Committee was definitely approved by Mr. Balfour before the Esher Committee was even thought of. For instance, the decision to terminate the operations against the Somalis was arrived at by a meeting of this Committee, Mr. Balfour himself being in the Chair and Lord Roberts and Sir William Nicholson members.

In all other respects Colonel Dunlop's book is an interesting and instructive narrative of Army progress and preparation in the years immediately preceding the British Empire's greatest fight for existence.

Lord Roberts. By Lieut.-Colonel H. de Watteville, C.B.E., M.A., *p.s.c.* (Blackie and Son, Ltd.). 5s.

This short life of a great man is one of a series commemorating recipients of the Order of Merit.

Lord Roberts' death took place twenty-four years ago, and to most of the younger generation, even to some approaching middle-age, he is becoming little more than a name: the events of his long life of service from the age of fourteen as a Sandhurst Cadet to his death in France sixty-eight years later were in danger of being forgotten.

The author has had the advantage of consulting Countess Roberts upon many points connected with her father's life and has made excellent use of this opportunity.

We are reminded that the gallant and ambitious young officer joined the Q.M.G's Department, which was then responsible for many of the duties now undertaken by the General Staff, in 1856 and served in it continuously for twenty-two years, the Second Afghan War providing his first real command in peace or war. During this period he made, in Abyssinia and in India, many attempts to reorganize and improve the archaic system of transport with which Simla was content, but it was not until he became Commander-in-Chief in India that it was eventually remodelled. As soon as sufficient seniority gave him the opportunity, Roberts throughout the remainder of his military career paid much attention to the training of the men under him, and also, what they appreciated still more, to their welfare and general amenities. One fact emphasized by Colonel de Watteville is that the two greatest soldiers of Victorian times—Roberts and Wolseley, never served in the same campaign together after 1858, when Roberts, invalided to England, handed over his appointment to the future Lord Wolseley. There is an intriguing note which tells how Roberts worked out a plan to relieve Khartum: with memories of Abyssinia and the march from Kabul to Kandahar, his plan envisaged the use of troops from India and a move from Suakin to Berber. The plan was abandoned; meanwhile Lord Wolseley, with thoughts of his Red River Expedition in his mind, carried out his plan of operating by the Nile. Later in the same year the two were candidates for the Command-in-Chief in India, but the complexion of the Russian situation tipped the balance and Lord Roberts was appointed.

During this command he advocated the " Forward Policy " on our North-West Frontier, and continued his work of reorganizing and training the Army in India.

A full account is given of Roberts' operations in South Africa and of his rather melancholy experience as the last Commander-in-Chief of the British Army; the true story of his dismissal from that high office is given—a story of ingratitude and rudeness which has too often to be recorded when the politician, dressed in a little brief authority, wishes to get rid of officers who have deserved very well of their country.

The final chapter, " The Voice in the Wilderness," tells of Lord Roberts' efforts for the " National Service League."

One small query may be made before recommending a valuable little book. The author refers, by its number, to a certain unit in Afghanistan as being " in poor condition "; four pages later he quotes a report which lavishes warm praise upon the same battalion. Why put up such a little ninepin only to knock it down with such a big ball? Another small defect—for which the author cannot perhaps be held responsible—is the practice of printing ranks without capitals: to Service eyes a General looks very incongruous as a " general."

Waziristan, 1936-1937. By Lieut.-Colonel C. E. Bruce, C.S.I., C.I.E., C.B.E., O.B.E. (Gale and Polden, Ltd.). 3s. 6d.

There could be no person better qualified to express an opinion on our present Frontier Policy—or lack of one—than Colonel Bruce, who served as a political officer on the border for some thirty-five years and whose father had the privilege of working there under Sir Robert Sandeman.

The perennial unrest in these areas is, in the opinion of the author, due to the fact that there are two borders—the Durand Line, which marches with the frontiers of Afghanistan and the Administrative Border, which is drawn some distance in rear of this line.

Colonel Bruce explains that to deal with the problem of the frontier tribes, two very different systems were adopted in the past: (*a*) the " Sandeman " system called after Sir Robert Sandeman, who adopted it with marked success in Baluchistan; and (*b*) the " Close Border " system, chosen for the remainder of the frontier. The fundamental difference between these two policies was that Sandeman envisaged the problem from the point of view of the welfare of the tribes and realized the moral obligations, which this entailed. On the other hand, the " Close Border " system, sometimes called " a policy of non-intervention tempered by punitive expeditions," was the very reverse of this, for under this system the belt of tribal territory was left to welter in a state of anarchy and chaos.

Colonel Bruce emphasizes that what is required is the free access of British Political officers—not military forces—to all parts of the country where their personal influence and care for the tribes would rapidly win over their sympathy and affection. He stresses the evils of lack of personal touch and the dangers inherent in the system of dealing with the tribes through " middlemen " who are often mere corrupt intriguers, intent upon amassing money for themselves. He declares that our accusations against the headmen of having lost their power and influence to control their tribesmen are unfair. He asserts, moreover, that if these allegations carry any weight at all, they are promoted by the failure of our political officers to support and sustain these headmen. Roads, in his view, are a means to

an end and not an end in themselves. They should be constructed—not for the purpose of rapidly deploying armed forces—but rather to afford our political officers freedom of access to all parts of the country.

Road construction is intimately bound up with the economic life of the tribes, and, in this sphere, Colonel Bruce alleges that far too little has been done to raise the standard of living in these barren areas. If only a fraction of the millions poured out on military expeditions had been expended on purposes connected with the social and economic welfare of the tribes, the peace of the border would, in the opinion of the author, have been built up on lasting and stable foundations.

Lee, Grant and Sherman. By Lieut.-Colonel A. H. Burne, D.S.O. (Gale & Polden). 10s. 6d.

The author has " cast his study in the form of an outline of events in the campaign of 1864–5, with a commentary at the end of each phase." This method gives full scope for criticism, and in his criticisms the chief interest of his work lies. Though his judgments of men and events often run counter to generally accepted views and in some instances will probably be pronounced heterodox, they are always fair, clearly and temperately expressed, and backed by evidence. They therefore deserve serious consideration. To the student they will prove stimulating and will help him to think for himself.

The order of merit in which Colonel Burne ranks the three Generals under discussion is that of the title-page; Lee is placed easily first. In his conduct of the campaign of 1864–5 only two flaws are to be found: first, he did not move Longstreet's corps over from the left to the centre before the Wilderness; second, he did not attack Grant's right wing on the North Anna on May 24th [25th]. Lee was not a " grand strategist "; he never attempted to be one, but concentrated upon the defence of Virginia. In exploiting his advantage of the interior lines Lee was at his best; Grant, struggling against the disadvantage of exterior lines, was no match for him.

Grant is highly praised as a strategist for his tenacity of purpose, broadness of conception and singleness of aim. But as a tactician he was uneven, inclined at times to " wobble," thus apt to let slip opportunities which his skill had created. Four such instances between the Rapidan and the James are enumerated. For the lamentable failure to capture Petersburg after the crossing of the James it is difficult to apportion the blame as between Grant and Meade.

If Grant is a fair second, Sherman appears a bad third. Colonel Burne is aware that his criticism of Sherman is provocative. " There was not much chaff in Sherman, and his reputation will stand the chaff being exhibited as well as the good grain." Nevertheless it is the chaff rather than the good grain which is exhibited in this study. The chief complaint against Sherman is that he substituted geographical for military objectives and thereby allowed three Confederate armies to escape, and that " his rigid adherence to a timed programme " caused him to rest and recondition his army when Grant was in hot pursuit of Lee. Incidentally Colonel Burne has a very good word to say for Hood and Early as independent Army Commanders, whilst he has little good to say for Sheridan in the same capacity, but he gives him full credit for his brilliant cavalry leadership in the Appomattox campaign.

It is a pity that so good a piece of work is marred by a considerable number of mistakes in regard to dates and names and certain others of more serious import.

Der Kampfwagenkrieg. By von Eimannsberger. (Lehmanns Verlag, Munich and Berlin).

Although this is a second edition of a well-known work, it has been so thoroughly remodelled as to rank as a new book. It had come to be regarded as the standard German work on tank warfare: this new edition fully justifies such a claim.

The author divides his matter into eight sections. After an Introduction, Section II gives a critical description of the work of tanks from August, 1917 (Third Ypres) until the close of hostilities. He dismisses Third Ypres as having no lesson of value for the future. Cambrai, however, inaugurated a new era, but ended in failure. The next great tank attack near Soissons on 18th July was a further step forward. But it is to the tank battle near Amiens on 8th August that he devotes the greatest attention. This he considers to have introduced new methods and to have proved an Allied success of importance, although it failed in two respects: firstly, after the original "break-through" there was no effective method of exploiting the breach; secondly, the combination of horsed cavalry and whippet tanks failed.

Sections III and IV are devoted to an interesting examination of these battles from the German side. In addition, he compares these "tank surprises" with the most successful of the German surprise attacks (without the help of tanks), namely, that of 27th May at the Chemin des Dames. This he considers the high-water mark of attacks of the old type—which cannot recur.

He next looks to the future. First, he traces the development of the tank from 1918 to 1938. He claims that a new arm now exists, for the use of which a clean beginning must be made, as the teachings of the Great War are misleading. Section VI is devoted to a study of the means available for fighting tanks. Section VII is a study of the new tactics which will result from the new tank. Lastly, in Section VIII —this is the most suggestive part of the book—he attempts to put together some conclusions as to the future of tank warfare as a whole. Here he foresees a combination of air warfare and tanks which seems convincing. He thinks that the matter of air-bombing of towns is exaggerated. At the root of the problem is the question of manufacture. No great Power, for some years at least, can afford to maintain tank armies of any size. The course of a future European war will, he considers, be guided by the speed with which all belligerents can place armoured formations—and aircraft—in the field. Failure to answer tank with tank may convert a small defeat in the field into a catastrophe of some magnitude.

REGIMENTAL HISTORIES

The Fifth in the Great War. A History of the 1st and 2nd Northumberland Fusiliers, 1914–1918. By Brigadier H. R. Sandilands, C.M.G., D.S.O. (Dover: G. W. Grigg & Son, "St. George's Press").

Brigadier Sandilands established himself as a reliable and readable narrator of the Great War period with his "23rd Division, 1914–19," published in 1924. His present account of the Great War actions of the regular battalions of his regiment, which raised more battalions than any other (a grand total of fifty-two), was first printed serially in the regiment's journal.

The 1st Battalion fought throughout on the Western Front, from Mons till victory. The 2nd Battalion arrived from India in time for "Ypres 1915." A few months later it was shipped to Macedonia, on which fever-stricken front it served with distinction till the German breaking of the Allied western lines in 1918 necessi-

tated the recall of so many troops to France. There it shared the honours of the final destruction of German military power.

The text of this well-produced volume is accompanied by forty-three excellent maps and twenty-two Imperial War Museum photographs. One of these has an unpleasantly topical interest: it shows the earliest mouth-pad and goggles, protection against poison gas.

AIR

A.R.P.—Lessons from Barcelona. By Major N. de P. MacRoberts, D.S.D., M.C. (Eyre and Spottiswoode). Price 6d.

The author, who is acting as Air Raids Precautions officer to one of the Metropolitan Boroughs of London, has experienced active service conditions during several of the aerial bombardments of Barcelona. His views, therefore, are entitled to carry considerable weight.

He makes the point that the organization of a system of alarm warnings is not so much the function of local authorities as a military responsibility. Any delay in sounding the alarm is bound to have a most adverse effect upon the whole A.R.P. organization. In Spain, he declares, the bursting of the first bomb in the streets has usually afforded the only warning received by civilians.

He stresses the supreme value of underground shelters and considers that a seven-foot deep trench in the open is as safe—possibly more safe—than a huge basement shelter under a building, whose roof may collapse and bury the occupants.

The pamphlet, which covers a wide field and includes such subjects as Gas, Fire Precautions, Essential Services, and Hospital Accommodation, is warmly recommended to our readers.

(Owing to pressure on space a number of reviews of books have been held over.)

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JOURNAL

OF THE

Royal United Service Institution

WHITEHALL, S.W. 1

PUBLISHED BY AUTHORITY OF THE COUNCIL.

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VOL. LXXXIII.

FEBRUARY TO NOVEMBER, 1938.

LONDON:
ROYAL UNITED SERVICE INSTITUTION,
WHITEHALL, LONDON, S.W. 1

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J. J. KELIHER & CO. LTD.
MARSHALSEA PRESS
SOUTHWARK, S.E.1

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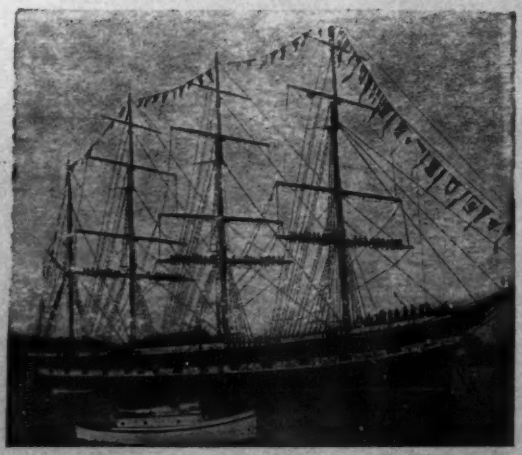

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"The R.U.S.I. Journal" is published on the 25th day of January, April, July and October of *each* year.

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